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CIMA F3
Financial Strategy

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A: FINANCIAL POLICY DECISIONS

Chapter 1

FINANCIAL AND NON-FINANCIAL OBJECTIVES

1. Introduction

The formulation and evaluation of an entity's financial strategy and strategic objectives will differ depending on the type of organisation.

There are many types of organisation and many different groups that have a stake in the performance of the organisation. These groups include:

- Shareholders
- The community at large (in particular, environmental considerations)
- Employees of the company
- Managers / directors of the company
- Customers
- Suppliers
- Finance providers (lenders)
- The government

The interests of all stakeholders need to be balanced when setting both the financial and non-financial objectives of the entity. This chapter helps evaluate the strategic financial and non-financial objectives of different types of entities.

2. Objectives of entities

The objective of a specific entity will depend upon the type of entity that is operating. Entities are split into for-profit and not-for-profit entities and can be further split into the following:

- Incorporated and unincorporated
- Quoted and unquoted
- Private sector and public sector

The objectives of each type of entity can be either financial (e.g. value for money, maximising shareholder wealth, providing a surplus) or non-financial objectives (e.g. human, intellectual, natural, and social and relationship).

For incorporated entities in the UK (and the USA) the focus is on the shareholders, on the basis that it is the shareholders that have a risk and return relationship with the company. The aim is to maximise shareholders' wealth while at the same time satisfying the requirements of the other stakeholders **(satisficing)**.

Shareholders wealth is measured by the market value of their shares. It is important therefore for the financial manager to consider the likely impact on the share price of alternative strategies, and to choose those that are likely to increase the share price.

In many countries of mainland Europe, and Japan, the focus is more on maximising corporate wealth which includes technical, human and market resources.

Example 1 – Financial objectives

A steady increase in earnings is LEAST likely to be a financial objective of which one of the following types of entity:

(a) **A public listed company**
(b) **A 'not-for-profit' entity**
(c) **A private limited company**
(d) **An unincorporated entity**

Example 2 – Profit and non-profit organisations

The primary objectives of for-profit and not-for-profit entities are:

	For-profit	Not-for-profit
(a)	Maximisation of wealth	Minimise costs
(b)	Output of goods/services	Minimise costs
(c)	Maximisation of wealth	Provision of goods/services
(d)	Output of goods/services	Provision of goods/services

3. Evaluation of financial objectives

3.1. Ratios and growth trends

Financial objectives are commonly evaluated using ratios (e.g. margins and gearing) and growth trends (e.g. earnings growth and dividend growth).

Example 3 – Ratio calculation (1)

The following information has been extracted from Froome's financial statements for the previous four years:

Year ended	*20X3*	*20X4*	*20X5*	*20X6*
Earnings ($ million)	10.4	12.5	15.8	17.2
Number of shares in issue at the end of the year	100	100	150	150

Calculate the compound average growth rate in earnings per share achieved between 20X3 and 20X6 to one decimal place.

Example 4 – Gearing

Cavendish is financed by a mixture of debt and equity, both of which are traded on public markets. It has 1 million equity shares in issue, which are currently trading at $1.74 per share, and $1.5 million of redeemable bonds that are trading at $97%.

Calculate the Cavendish's gearing, as debt/equity, and using market values.

3.2. Investor ratios

Private sector, for-profit entities are focussed on the maximisation of shareholder wealth and therefore the financial manager will commonly use investor ratios to appraise the company performance to see if it is in line with shareholder expectations.

Example 5 – Return on equity

Thomas has generated profits before interest and tax of $19.5 million and a profit for the year of $12.5 million. The company has $18 million of debt finance in the statement of financial position and the share capital and reserves is stated at $138 million.

Calculate the return on capital employed and the return on equity.

Example 6 – Annual return to investors

Trott's shareholders require an annual return of 15% per annum. In the most recent financial statement of Trott, a dividend of $0.15 per share was recorded.

Trott's share price stood at $2.35 at the start of the year and had grown to $2.54 at the year-end.

Calculate the annual return and determine whether this will satisfy the requirement of the shareholders.

Example 7 – Earnings yield

Kenny has a share price of $2.50 and an EPS of 52 cents per share. Its main competitor has a P/E ratio of 6.

Calculate Kenny's P/E ratio and earning yield, and use this to establish which company the markets consider as having a better future performance.

Example 8 – Dividend ratios

An extract from Hoy's statement of profit and loss is as follows:

	$ million
Revenue	134.2
Operating costs	(67.6)
Operating profit	66.6
Interest	(8.2)
Profit before tax	58.4
Tax (25%)	(14.6)
Earnings	43.8

Additional information contained in the notes to the accounts reveals the following:

The market value of each equity share was $1.84 at the year-end, and there were 100 million in issue.

A dividend per share of $0.15 was paid during the year.

Calculate the following ratios:

(a) Dividend yield
(b) Dividend cover
(c) Dividend pay out
(d) Price earnings

3.3. Economic changes

Financial objectives are sensitive to changes in the underlying economic changes, which are not within the control of the financial manager. The following economic variables need to be assessed in formulating a financial strategy:

- Interest rates
- Exchange rates
- Inflation

Economic variables will have an impact on business variables such as margins and earnings.

Example 9 – Economic variables

Wiggins's statement of profit or loss for the most recent financial year has been prepared as follows:

	$ million
Revenue	134.2
Operating costs	(67.6)
Operating profit	66.6
Interest	(8.2)
Profit before tax	58.4
Tax (25%)	(14.6)
Earnings	43.8

The company is concerned about the predicted changes in the economy. It is forecast that sales will fall by 15% due to increased competition from overseas but that operating costs will rise by only 5%.

Interest rates are predicted to fall to 5% on the $100 million variable rate loan and the tax rate will fall to 22%.

Calculate the expected earnings for the next year and the percentage change in earnings, adjusting for the predicted changes in the economy.

Chapter 2

SUSTAINABILITY AND INTEGRATED REPORTING

1. Introduction

This chapter addresses the limitations of financial statements and how the Global Reporting Initiative's (GRI's) Sustainability Reporting Framework and International Integrated Reporting Council's (IIRC's) guidance can address some of the limitations.

2. Limitations of financial statements

Financial statements focus on the past financial performance of an entity and have not focused on non-financial objectives. It has become more important in the modern financial world to evaluate not just financial objectives but also the non-financial objectives within an entity.

- **Human** – Entity work force and retention of key staff, leads to better financial performance and there is less disruption in the workforce and a high degree of trust is built up between employees.
- **Intellectual** – Technology businesses generate ideas that are the intellectual property of that entity and therefore add value to the business. Although they may meet the generic definition of an intangible asset they cannot be recognised in the financial statements
- **Natural** – Businesses need to be more environmentally aware of the impact of their business practices on the environment. Financial statements have not shown this impact and need to evolve to ensure coverage is given to key environmental issues.
- **Social and relationship** – Better relationships between business and society can promote a better financial performance.

Example 1 – Non-financial objectives

Which of the following are examples of non-financial objectives?
Select ALL that apply.

(a) A reduction in staff turnover of 10%
(b) A growth in earnings per share of 4%
(c) A reduction in the company's carbon footprint by 25% over the next 5 years
(d) An increase in share price of 5%
(e) An increase in company charitable donations of 10%
(f) A reduction in the number of staff sick days to below national average

Until recently companies were free to report these objectives how they wished and there was limited guidance available to help them do so. Given the importance of these non-financial objectives, particularly the social and environmental issues, guidance has now been developed via the two following frameworks:

- Global Reporting Initiative's Sustainability Framework
- International Integrated Reporting Council

3. Global Reporting Initiative (GRI)

The aim of the GRI is to encourage the use of performance indicators that help stakeholders understand:

- **Economic** - flow of capital amongst different stakeholders
- **Environmental** - use of inputs and control of outputs in areas such as energy, material and water usage, emissions
- **Social Perspectives** - Labour Practise / Human Rights / Society / Product Responsibility

It is a not-for-profit entity that aims to promote economic sustainability through the setting of goals, measuring performance and managing change and improve the voluntary disclosures related to this.

3.1. Guidelines

- Guidelines consist of a Core option and Comprehensive option of principles and disclosure.
- Universal guidance for reporting on sustainability performance, applicable to all companies including both SME's and NFP's
- Most recent issue published in May 2013 (G4)

3.2. Disclosures

- General standard disclosures
  - Strategy and analysis
  - Organisational profile
  - Identified material aspects and boundaries
  - Stakeholder engagement
  - Report profile
  - Governance
  - Ethics and Integrity
- Specific standard disclosures:
  - Disclosure on Management Approach (DMA)
  - Indicators

3.3. Reporting Principles

Content

- Stakeholder Inclusiveness
- Sustainability Context
- Materiality
- Completeness

Quality

- Balance
- Comparability
- Accuracy
- Timeliness
- Clarity
- Reliability

3.4. Process for GRI Report

- Identification
- Prioritisation
- Validation
- Review

Example 2 – Global Reporting Initiative (1)

A company adopts the Global Reporting Initiative (GRI) and issues an annual sustainability report in accordance with the guidelines.

Which of the following are not part of the general standard disclosures?
Select ALL that apply.

- Management approach
- Ethics and integrity
- Stakeholder engagement
- Governance

Example 3 – Global Reporting Initiative (2)

A company adopts the Global Reporting Initiative (GRI) and issues an annual sustainability report in accordance with the guidelines.

Which of the following disclosures are part of the general standard disclosures?
Select ALL that apply.

- Management approach
- Ethics and integrity
- Stakeholder engagement
- Governance
- Organisational profile
- Strategy and analysis

4. International Integrated Reporting Council (IIRC)

The International Integrated Reporting Council's Framework outlines the principles and concepts that govern the content of an Integrated Report <IR>. It aims to communicate how an entity will create value over time and identify the key drivers of its value and its primary objective is:

'To provide insight about the resources and relationships used and affected by an organization – these are collectively referred to as "the capitals"

The capitals are stocks of value that are increased, decreased or transformed through the activities and outputs of the organization. They are categorised by the Framework as:

- Financial
- Manufactured
- Intellectual
- Human
- Natural
- Social and relationship

4.1. The Framework

The purpose of this Framework is to establish Guiding Principles and Content Elements that govern the overall content of an integrated report, and to explain the fundamental concepts that underpin them.

4.1.1 Guiding Principles

A key factor in the development of the framework is that previous attempts to highlight non-financial factors, notably the management commentary and the Operating and Financial Review (OFR), became too cluttered and focussed on the positives and not the negatives. The <IR> framework has therefore recommended Guiding Principles to aid the content of the report and how it is presented.

The Guiding Principles that underpin the preparation and presentation of an integrated report are:

- Strategic focus and orientation
- Connectivity and information
- Stakeholder relationships
- Materiality
- Conciseness
- Reliability and completeness
- Consistency and comparability

4.1.2 Content Elements

The key components of an integrated report are as follows:

- Organisational overview and the external environment under which it operates.
- Governance structure and how this supports its ability to create value.
- Business model.
- Risks and opportunities and how they are dealing with them and how they affect the company's ability to create value.
- Strategy and resource allocation.
- Performance and achievement of strategic objectives for the period and outcomes.
- Outlook and challenges facing the company and their implications.
- Basis of preparation and presentation

Example 4 – The Capitals

The IIRC's IR Framework defines the resources and relationships of an entity as the capitals.

Which of the following are defined by the IIRC's IR Framework as capitals?
Select ALL that apply

- Materiality
- Human
- Sustainable
- Conciseness
- Intellectual

Example 5 – The Guiding Principles

The IIRC's IR Framework establishes both guiding principles and content elements.

Which of the following are defined by the IIRC's IR Framework as guiding principles?
Select ALL that apply

- Manufactured
- Materiality
- Social and relationship
- Conciseness
- Reliability and completeness
- Business model

Chapter 3

FINANCIAL MANAGEMENT POLICY DECISIONS

1. Introduction

The purpose of this chapter is to introduce the framework within which financial managers operate, and to identify the main areas where they have to make decisions.

The main types of decisions that need to be made are:

- Investment decisions
- Sources of finance decisions
- Decisions regarding the level of dividend to be paid
- Decisions regarding the hedging of currency or interest rate risk

2. Investment, financing and dividend decision

The investment, financing and dividend decision cannot be treated in isolation as there is an interrelationship between them. Financial managers need to forecast financial statements and the future cash position which incorporates the policy decision made.

The **investment decision** can impact the company's future profitability through an increase in sales. This is usually achieved through the purchase of non-current assets, which in turn increases the depreciation charge and reduces profitability.

The **financing decision** will have an impact on either the entity's equity (share capital and share premium) or non-current liability balances depending on whether the decision involved issuing equity or debt finance.

- If debt finance is chosen this will increase the finance costs within the statement of profit or loss and will therefore reduce profitability.
- If equity finance is chosen there is additional pressure to pay dividends, which can only be paid if there is sufficient distributable profits and cash resources available.

The **dividend decision** is discussed in further detail in a later chapter but the decision on the level of dividend will have an impact on the financing decision as if dividends are restricted then there is additional cash available for investment which reduces the burden on finding additional finance to fund positive NPV projects.

It is important therefore to assess the impact of these decision not only on the forecast financial statements and future cash position but also the impact the decisions can have on the following:

- Investor ratios
- Lender ratios
- Compliance with debt covenants
- Attainment of financial objectives

Example 1 – Financing decision

Skelton is looking to finance a new project through the issue of debentures. The company is looking to raise $25 million and will pay interest at 4%.

Skelton currently has a $40 million 5% loan outstanding to which a covenant has been attached. The covenant requires that an interest cover of 5 times is to be maintained.

Skelton's most recent financial statements show profits before interest and tax of $16.5 million.

Calculate the interest cover if the project were to be financed using the bank borrowings and determine if the covenant is still complied with.

B: SOURCES OF LONG-TERM FINANCE

Chapter 4

CAPITAL STRUCTURE OF A FIRM

1. Introduction

The financing decision involves evaluating an appropriate method of finance, debt or equity, to fund a new investment project. It is an important decision to get correct because the type of finance used will have a direct impact on the value of the entity as the change in the level of debt to equity impacts the cost of capital, which can then affect the investment decision.

This chapter introduces the theories derived that look at how the finance issued impacts the value of the business, and is otherwise referred to as the capital structure theories.

2. Traditional theory

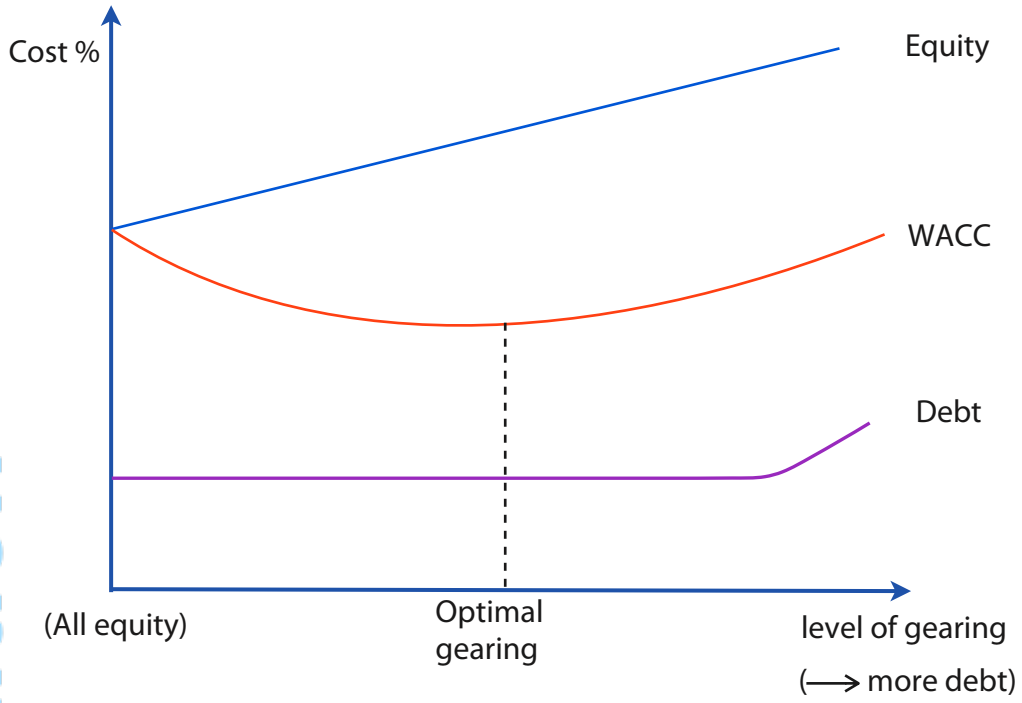
It has long been accepted that:

(1) Equity borrowing is more expensive than debt borrowing

and,

(2) Higher levels of gearing increase the risk to shareholders, and therefore result in higher costs of equity.

It would seem sensible therefore that if the level of gearing in a company changes, then so too will the WACC.



The above graph is only illustrative. The actual way in which the cost of equity reacts to changes in gearing does not matter – all that matters is that as gearing increases, the cost of equity will increase and the weighted changes. As a result, it seems sensible that the WACC will change in some way and that therefore there must be a level of gearing at which the WACC is at a minimum – the optimal level of gearing.

The implications of the above are as follows:

- Since a company should always wish to borrow in the cheapest possible way, it should raise debt finance until it achieves the optimal level of gearing
- Once the company has reached its optimal level of gearing, it should maintain that level of gearing by raising future finance part equity/part debt in such a way as to keep the optimal level of gearing unchanged.
- Whilst gearing up, the company should appraise projects at the cost of the extra finance raised (the marginal cost of capital).
- Once optimal gearing has been achieved (and is maintained) then projects should be appraised at the cost of the extra finance raised. However, since the WACC will remain unchanged, the cost of the extra finance will be equal to the WACC.

All of the above is really an expression of common sense rather than any theory.

In the absence of any additional information, we assume that the company has reached its optimal level of gearing and is maintaining it, so therefore we appraise projects at the WACC.

However, although the above does illustrate the fact that it is important that a company thinks carefully about how to raise additional finance, it would be useful if a company were able to know in advance as to what their optimal level of gearing were in order that they could go straight to it

The traditional theory only illustrates the importance of gearing; it does not attempt to quantify the effect of changes in gearing.

In the 1950's, two academics – Modigliani and Miller – decided to try and quantify it on the basis that the risk to shareholders through higher gearing is something that is quantifiable. As a result, we should be able to predict the effect of the cost of equity of higher gearing, and therefore predict the WACC.

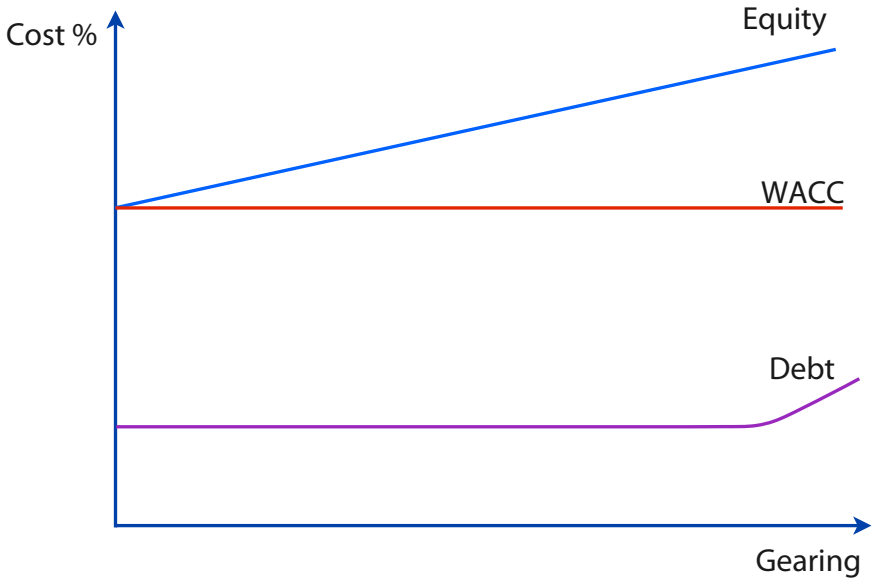
3. Modigliani and Miller

Modigliani and Miller (M&M) did a lot of work on the effect of the financial structure of a company on the cost of capital.

3.1. M&M proposition without taxes (1958)

M&M state that (ignoring tax) higher gearing will create more risk for shareholders and hence the cost of equity will increase, but that this is 'compensated' for by the lower cost of debt.

As a result, they stated that the weighted average cost of capital will stay constant for a company, however the company is financed.



The implications of their results are as follows:

(1) It is irrelevant how a company raises finance – the overall cost of borrowing will be unaffected

(2) All investments should be appraised at the WACC, however they are actually financed.

A further implication is that the total market value of the company (equity plus debt) will be unaffected by changes in gearing. This is to an extent logical, because whichever way in which the company is financed, the total available for distribution will be unchanged – if more goes to debt then there is less to equity, and vice versa, but the total must be the same. Therefore, why should the total value of the company be any different?

Note: Modigliani and Millers' proof is outside the syllabus and is therefore not reproduced in these notes.

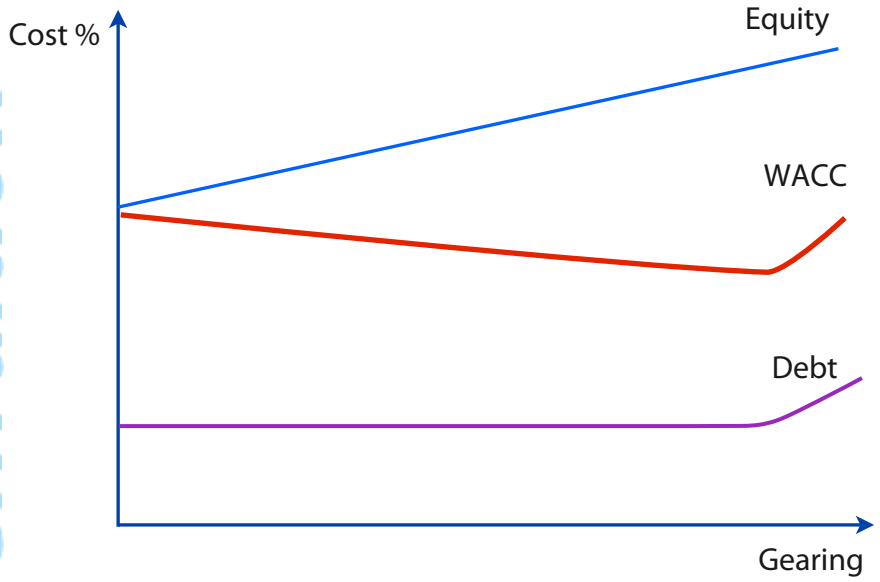
Although the above caused a lot of interest at the time, it had limited practical relevance because it ignored all taxes.

4. M&M proposition with company taxes (1963)

Modigliani and Miller developed their theory further incorporating a world with corporation tax (but initially ignored personal taxes).

Debt interest gets tax relief, which makes the effective cost of debt to a company lower. However, corporation tax has no effect on the cost of equity because dividends are not tax allowable. As a result, even though the cost of equity will increase with higher gearing, the WACC will fall.

As a result, a company should raise as much debt as possible.



The implications of the above are as follows:

(1) the WACC will fall with higher levels of gearing

(2) a company should raise as much debt as possible (in order to get as much tax relief as possible)

A further implication of the above is that as the level of gearing increases, the total market value of the company (equity plus debt) will also increase. This is in fact logical because as the company has more debt borrowing and therefore pays more interest, they will pay less tax on the same (before interest) profits and therefore be able to distribute more in total (to equity and debt together). If they are able to distribute more then certainly the total value of the company should be higher.

Although the introduction of corporation tax did make the model more practical, it did still ignore personal tax. They did do further work on the effect of personal taxation, but this is not in the syllabus.

5. M&M assumptions

Their main assumptions are as follows:

- Shareholders have perfect knowledge
- Shareholders act rationally with regard to risk
- A perfect market exists
- Debt interest is tax allowable (and the company is able to get the benefit of it)
- Investors are indifferent between corporate gearing and personal gearing
- The debt borrowing is irredeemable

Example 1 – M&M assumptions

Modigliani and Millers' 1963 Theory of Capital Structure assumes that:

- The cost of equity remains constant regardless of the gearing level
- Financial distress does not carry any cost
- Companies can borrow at zero cost
- A company is liable to tax but not its shareholders

6. M&M formulae

Modigliani and Miller produced formulae expressing how the cost of equity, WACC and total market value of the company are affected by the level of gearing.

The formula for calculating how the cost of equity will change with changes in gearing is provided on the formula sheet in the examination, and is as follows:

$$k_{eg} = k_{eu} + [k_{eu} - k_d]\left[\frac{V_D[1-t]}{V_E}\right]$$

where:

k_{eg} = cost of equity (of a geared company)

k_{eu} = cost of equity of the company if ungeared

V_E and V_D are the market values of equity and debt

k_d = pre-tax cost of debt

t = rate of corporation tax

The formula for calculating how the WACC will change with changes in gearing is provided on the formula sheet in the examination, and is as follows:

$$WACC = k_{eu}\left[1-\left(\frac{V_D t}{V_E + V_D}\right)\right]$$

Example 2 – M&M formulae

London plc is an ungeared company with a cost of equity of 15%.

They propose raising debt at 8% (pre-tax) and have estimated that the resulting gearing ratio (debt:equity) will be 0.4.

The rate of corporation tax is 30%.

Required

(a) Calculate the cost of equity after raising the debt, and

(b) Calculate the weighted average cost of capital before and after raising the debt.

Chapter 5

LONG-TERM DEBT FINANCE

1. Introduction

In order to finance long-term investments and the overall working capital, the company needs to raise long-term capital. It is part of the role of the Financial Manager to decide how best to raise this capital. Overall the choice is between equity finance (from shareholders) and debt finance (from lenders). In this chapter we will look at the alternative methods available to a company of raising long-term debt finance.

2. Types of long-term debt

2.1. Bank borrowings

The simplest and most convenient form of long-term debt finance is to arrange a loan through a bank. Considerations on bank borrowings as debt finance include:

- Fixed interest vs. variable interest
- Secured vs. unsecured
- Period of maturity
- Currency

2.2. Preference shares

These are shares with a fixed rate of dividend having a prior claim on profits available for distribution (unlike ordinary shares where the dividend can fluctuate). On liquidation of a company, preference shares rank before ordinary shareholders.

Although legally equity, these are often treated as debt because they carry a fixed dividend, thus creating an obligation to pay cash making it similar to debt.

Dividends are only payable if there are sufficient distributable profits. The dividends are not tax deductible to the company.

If not sufficient, then the right to dividend is carried forward if they are **cumulative** preference shares. Otherwise the right to dividend for that year is lost.

Advantages

- They do not carry voting rights and there is therefore no loss of control
- Unlike debt, dividends do not have to be paid if not enough profits and the shares are not secured on the company's assets

Disadvantages

- Dividends are not tax allowable, unlike debt interest
- To attract investors there will be a need to pay a higher rate of interest because of the extra risk for shareholders.

2.3. Debentures (Loan Stock or Bonds)

A debenture is a written acknowledgement of a debt containing provisions for the payment of interest and repayment of the principal.

The debentures may be **secured** or **unsecured**. Secured means that if the company goes into liquidation then the debenture holders have first charge on the assets that are used as security. Unsecured debentures do not have this benefit and therefore usually need a higher rate of interest to compensate lenders.

Debentures can be traded on a stock exchange, normally in units of $100 nominal. They carry a fixed rate of interest and the interest is expressed as a % of nominal value.

Irredeemable debentures are never repaid (and do not exist in practice!). Redeemable debentures are repayable at a fixed date (or during a fixed period) in the future. They are usually repaid at their nominal value (at par) but may be issued as repayable at a premium on nominal value.

Advantages

- The interest paid by the company is usually less than the dividend the company would have to pay to shareholders. This is because investors find them less risky than shares and therefore require a lower return.
- The interest paid is tax allowable to the company and therefore the net cost to the company is reduced.

Disadvantage

- The higher the amount of debt finance, the more fixed interest has to be paid out of profits that would otherwise be available to shareholders. This makes the dividends riskier as far as the shareholders are concerned. This point will be explained in more detail in the next chapter.

2.4. Deep discount bonds (or debentures)

These are debentures which are issued at a large discount on nominal value, but are repayable at par on maturity.

Investors will receive a large 'bonus' on maturity and will therefore be prepared to accept a lower rate of interest from year to year.

The advantage to companies which are growing is that they pay low interest during the life of the debentures. Hopefully, when the time comes to redeem the debentures the company will be in a position to redeem them at par (possibly issuing more conventional debentures to finance the redemption).

2.5. Zero coupon bonds

These are bonds or debentures which are issued at an extremely large discount on their nominal value, but are redeemable at par on maturity.

Just as before, the investors will receive a large 'bonus' on maturity, but because the discount is so large they are prepared to receive no interest at all during the life of the bond.

3. Returns on debt

3.1. Interest yield

$$\text{Interest yield} = \frac{\text{Annual interest payment}}{\text{Market value of debt}} \times 100\%$$

This measures the return to investors each year ignoring any 'profit' or 'loss' on redemption.

3.2. Redemption yield

This is the overall return earned by investors taking into account both the annual interest and the gain or loss on redemption.

The gross redemption yield is calculated as the IRR of the future cash flows.

4. Debt covenants

To reduce the risk of default the provider of debt finance, will attach rules that the borrower needs to adhere to throughout the life of the debt.

These rules are referred to as debt covenants. Examples of debt covenants are as follows:

- The borrower must maintain an interest cover above a prescribed figure
- The borrower must ensure that gearing does not rise above a prescribed level

5. Swaps

Companies have the option to borrow funds at either a fixed or floating rate of interest.

The advantage of fixed rate borrowing is that once the loan has been taken out, the interest payments are then certain and there is no risk due to future movements in interest rates.

However, a company may prefer to borrow at floating rate for two reasons:

(1) They think that interest rates are going to fall and thus borrowing at floating rate will enable them to get the benefit of the fall (although clearly there is still a risk that they are wrong and that interest rates will rise)

(2) If they are in a type of business whose income rises and falls as interest rates rise and fall, then it makes good sense to borrow at floating rate so that their expense falls as their income falls.

Regardless of whether a company chooses to borrow fixed or floating, some companies can borrow at better rates than other companies depending on their credit rating.

Because of this, it is potentially (but not always) possible for two companies to swap their borrowings in a way that saves money for both of them. This arrangement is called an interest rate swap.

Example 1 – Interest rate swaps (1)

Company X can borrow at a fixed rate of 10% or at a floating rate of LIBOR + 3%.

Company Y can borrow at a fixed rate of 12% or at a floating rate of LIBOR + 6.5%.

Company X wishes to borrow at fixed rate, whereas company Y wishes to borrow at floating rate.

Show how a swap can benefit both companies.

Example 2 – Interest rate swap (2)

Company A and Company B can borrow as follows:

	Fixed	*Floating*
Company A	10%	LIBOR + 1%
Company B	11%	LIBOR + 1.5%

LIBOR is currently 9%

Company A's income fluctuates with interest rates, whereas B's does not. They both wish to borrow the same amount.

Explain how an interest rate swap can benefit each party.

6. Convertibles and Warrants

6.1. Convertibles

Convertibles are debentures that give the investor the choice on redemption of either taking cash or taking a pre-determined number of shares in the company.

The advantage of convertibles to investors is that they allow the shareholders to gain if the company does well (and the share price increases), but they do not lose if the company does badly (provided that the company does not collapse completely!).

The advantage to the company is that they will pay a lower rate of interest (because investors find them attractive). Also, provided the company does well and investors do convert, the company will avoid any cash flow problem associated with repaying the debentures.

Example 3 – Convertibles

A company has in issue 8% debentures 2019, which on maturity can be redeemed at par or converted to 20 ordinary shares in company for every $100 nominal.

The share price is currently $4.50 per share.

Required

(a) What will debenture holders choose to do on maturity if the share price of the company in 2019 is:

i) $4 per share

ii) $6 per share

(b) If investors required return on debentures is 10% and if today is the end of 2016 and the share price is expected to grow at 7% p.a.

i) Calculate the current market value.

ii) Calculate the conversion premium

6.2. Warrants

A warrant is a right given to investors to subscribe for new shares at a future date at a fixed price.

They are sometimes issued with debentures in order to make them more attractive to investors (and therefore allow the company to pay lower interest).

The warrants may be bought or sold separately from the debentures during the exercise period.

7. Lease versus Buy

When deciding whether or not an investment is worthwhile, we usually assume that we will be purchasing the asset.

However, having made the acquisition decision we could be required to consider financing the machine by way of leasing it rather than buy outright purchase.

In order to make this financing decision we need to calculate the PV of the costs of buying the assets with the PV of the costs of leasing the asset. In both cases we will discount at the after-tax cost of borrowing and choose that method which gives the lower PV (and hence least cost).

Finance lease (risk and reward of ownership) – Discount the annual, post-tax lease rentals and post-tax repair costs to present value.

Operating lease (no risk and rewards of ownership) – Discount the annual, post-tax lease rental to present value

Example 4 – Lease vs. Buy

A company is considering whether to buy a new machine at a cost of $100,000 or alternatively to lease it for $35,000 p.a. (lease payments payable at the start of each year).

Buying it will involve borrowing money at an after tax interest cost of 7% p.a.

If the machine is bought, it will be bought on the last day of current financial year.

The machine will be needed for 4 years, and (if purchased) will have a scrap value after 4 years of $10,000.

Corporation Tax is 30% (payable one year after the end of the financial year)

Capital allowances are 25% (reducing balance).

Should the machine be leased or purchased?

Chapter 6

EQUITY FINANCE

1. Introduction

In this chapter we evaluate and compare alternative methods of raising equity finance and its implication for the management of the entity and its stakeholders.

We also look at rights issue related calculations, including the impact on shareholder wealth and the calculation of the theoretical ex-rights price (TERP) and the yield-adjusted TERP

2. Methods of issuing shares

2.1. New shares – quoted companies

If a company is already quoted on a stock exchange, then the following methods are available for the issue of new shares:

- **Public issue (offer for subscription)**

  A sale direct to the general public. Shares are advertised at a fixed offer price and the public are invited to buy them. It is difficult in practice to determine a fixed offer price that satisfies both the existing and new shareholders.

Example 1 – New share issues and pricing

A company has 10 million shares in issue at $2.50 each and is looking to raise an additional $2.4 million via an issue of new shares to fund a project with an NPV of $3.50 million.

Required

(a) Calculate the gains accruing to the new and existing shareholders if the shares are issued at $2.40 each.

(b) Calculate the share issue price if all of the gain is to go to the existing shareholders.

- **Public offer for sale by tender**

  A sale direct to the general public. However, a price for the shares is not fixed and the public are invited to bid for shares.

- **Placing**

  With a placing, a sponsor (usually a merchant bank) arranges for its clients to buy shares. However, at least 25% of the shares placed must be made available to the general public.

- **Rights issue**

  An offer to existing shareholders to buy new shares in proportion to their existing shareholdings.

  The number of shares that each shareholder is offered is in proportion to their existing shareholding. The shares are offered at a relatively low price (issue price) to the current

market value (cum-rights price) to protect against the risk of a fall in share price during the offer period.

The effect of the issue is to reduce the market value of all the shares in issue. The value of the share after the rights issue is referred to as the theoretical ex-rights price (TERP) and is calculated as a weighted average of the value of shares in issue following the rights issue.

Example 2 – TERP

A company's current share price is $5/share and makes a 1-for-4 rights issue at $3/share.

Required

(c) Calculate the theoretical ex-rights value per share

(d) Calculate the value of a right?

Example 3 – TERP and impact on shareholder wealth

The current share price is $8 per share.

The company makes a rights issue of 1 for 3 at $6 per share.

Required

(a) Calculate the ex-rights market value

(b) Calculate the value of a right

(c) Calculate the change in wealth for Mrs X who owns 1,200 shares, assuming she takes up half her rights and sells the other half.

A yield adjusted theoretical ex-rights price can be calculated if the new share purchase is anticipated to have a higher growth rate than the previously held shares.

Example 4 – Yield adjusted theoretical ex-rights price

A company has the following information available:

- WACC of 12%
- Corporate income tax rate of 30%
- 250 million $1 ordinary shares in issue
- Current share price of $2.25

The company announces a 1 for 4 rights issue at a discount of 10% to the current share price. The funds raised will be used to finance a project with an expected return of 14%.

Calculate the yield adjusted theoretical ex-rights price

To calculate the theoretical ex-rights price and yield adjusted theoretical ex-rights price, we can use the following formula:

$$\text{TERP} = \frac{1}{N+1}[(N \times \text{cum rights price}) + \text{issue price}]$$

$$\text{Yield adjusted TERP} = \frac{1}{N+1}[(N \times \text{cum rights price}) + \text{issue price} \times (Y_{new}/Y_{old}]$$

2.2. Unquoted companies

If a company is unquoted, it can become quoted if they choose (and are able) to become quoted on a stock exchange, then the methods listed above become available to them.

It is difficult for a small company to become quoted on a stock exchange and have access to more finance because it is necessary that the company is already of a certain size before it will be accepted on to a stock exchange.

To help smaller companies, there exist two stock exchanges in the UK – the full exchange (or Official List) which is for large companies, and the AIM (Alternative Investment Market) which is for smaller companies.

You are not required to learn the detailed requirements for the two exchanges but the purpose of the AIM is to enable smaller companies to get their shares traded on a stock exchange so that they can then raise more share finance more easily and become bigger.

If the company remains unquoted new shares can only be issued by way of a rights issue or a private placing.

Another possible method of becoming listed is for the smaller private company to buy the shares in the larger listed company, in a process known as a reverse takeover. It can also be where a smaller company buys a larger company, without the larger one necessarily being listed.

2.3. Bonus issues

Bonus issues (or scrip issues) are the turning of reserves into share capital and issuing free shares to existing shareholders. The new shares are issued in proportion to shareholders' existing shareholdings.

They are issued free and are therefore not a source of finance.

They have the effect of reducing the market value per share of all the shares in issue, and can thus make the shares more marketable.

2.4. Stock splits

Stock splits occur when shares are split in value. For instance, each existing $1 share might be split into two 50c shares.

The total share capital of the company is unchanged, but there will be more shares in issue.

No cash is raised and therefore this is not a source of finance. It will have the effect of reducing the market value per share of all the shares in issue, and can thus make the shares more marketable.

2.5. Scrip dividends

This is the offering to shareholders of new shares instead of a cash dividend.

Shareholders are given the choice of whether to take the dividend in the form of cash or new shares. The incentive for shareholders is that it is a cheaper way of acquiring new shares then buying them on the stock exchange, and also there can be tax advantages.

For the company, this is a source of new finance in that new shares are issued (effectively) for cash. It is a cheap way of raising finance and does not risk upsetting the shareholders in the same way that a reduction in dividend may do.

Chapter 7

DIVIDEND POLICY

1. Introduction

The fundamental role of the financial manager is to maximise shareholder wealth. Since, in theory, the value of shares is heavily dependent on future expected dividends, it is important to consider the dividend policy of the company and the effect this may have on shareholder expectations.

The most common source of finance for most companies is to use retained earnings. This is equity finance in that all the earnings of the company belong to the shareholders. However, most companies do not pay out all their earnings as dividends, but instead retain a proportion of them as a source of finance in order to expand the company.

Retained earnings are the best source of finance in that they avoid issue costs and the cash is immediately available.

2. Dividend irrelevance

Modigliani and Miller argued that the level of dividend is irrelevant and that is simply the level of profits that matters. Their logic was that it is the level of earnings that determines the dividends that the company is able to pay, but that the company has the choice as to how much to distribute as dividend and how much to retain for expansion of the company.

A large dividend will result in little future growth whereas a smaller dividend (and therefore more retention) will result in more growth in future dividend. It is expected future dividends that determine the share price and therefore the shareholders should be indifferent between the alternatives outlined above.

As a result, the company should focus on improving earnings rather than worry about the level of dividends to be paid.

In theory it is irrelevant whether a company pays out all its earnings to shareholders as dividend, or retains all the earnings for investment (or any combination of the two).

The reason for this is that although a lower dividend obviously means less immediate cash for the shareholders, this is compensated for by the fact that the extra investment by the company will increase the value of the company (and its share value).

In theory the shareholders will be indifferent because the increase in the value of their shares will compensate them for the lower dividend.

3. Practical influences on dividend policy

Although in recent years it has become common for companies to have high retention of earnings and pay low dividends (or even to pay no dividends – e.g. Microsoft), it is risky for a company to change its dividend policy without considering the consequences.

Despite the above, shareholders are affected by the dividend policy of the company for various reasons and the following practicalities need to be considered:

- **Signalling effect**

  If a company reduces a dividend then there is a danger that it will worry the shareholders, even if it results from increased retention and not from a fall in earnings. The danger is that whatever information is given to shareholders about the reasons, their immediate reaction might be to assume that the company is performing badly. If this is their reaction then they will reduce their future expectations with an adverse affect on the share price. Similarly an increase in the dividend payment may serve to increase their future expectations even if it results simply from a reduction in retention rather than an increase in earning.

- **Liquidity preference/clientele effect**

  A constant dividend policy (e.g. always distributing 20% of earnings, or always increasing dividend by 5% p.a..) will attract a group of shareholders to whom the policy is suited (in terms of, for example, their tax position, or their need for income). Changing the dividend policy will upset these shareholders.

  Some shareholders invest for income and others for capital growth. If they require income then they will choose to invest in companies that have a record of high dividend payments whereas if they prefer growth then they will choose companies that have a record of lower dividends but more retention and expansion.

  If, for example, an investor requires income and has therefore chosen a company paying high dividends, they are going to be unhappy if the company changes its policy and starts to retain a higher proportion of earnings.

  Modigliani and Miller counter this by saying that since the expansion should increase the share price then shareholders needing cash can always sell some of the shares to recoup the fall in dividends. This is fine in theory, but ignores transaction costs and also the fact that shareholders can argue that their company should pay them their cash directly and not 'force' them to start selling shares.

- **Taxation**

  As stated already, the basic choice is between high dividends with low capital growth, or low dividends with high capital growth.

  Dividend income is taxed differently from capital gains and therefore the tax position of the investors can influence their preference.

4. Dividend policies

In practice there is a tendency for companies to do particular things in relation to dividends:

- **A steady pattern of dividends**

  e.g. to have a policy of increasing dividends by 5% p.a.. This enables investors to choose the companies whose dividend policy they prefer, and avoids the signalling problem.

  Clearly, the company can only maintain 5% growth in the long-term provided that they can achieve the same earnings growth. Therefore they follow a policy that they think is achievable and trust that years where earning grow in excess of 5% will fund years where earnings grow at less than 5%. They do however leave themselves open to a dramatic 'signalling' problem if they ever are forced to deviate from their stated policy.

- **A scrip dividend**

  a very common practice in recent years has been to offer investors the choice between taking dividends in cash or in shares. This overcomes the 'liquidity preference' problem by allowing each shareholder to choose whichever is best for them.

- **No dividend**

  High growth companies will use the profits generated by the company to reinvest in new high growth projects. In order to maximise the funds available for investment the company will not pay out any dividends and the shareholders will rely solely o the increase in share price resulting from the high growth of the company.

C: FINANCIAL RISKS

Chapter 8

SOURCES AND TYPES OF FINANCIAL RISKS

1. Introduction

The types of financial risk that an organisation may have to manage are:

- Interest rate risk
- Currency risk (incl. economic risk)
- Political risk

Financial managers will be required to identify if these risks are faced by the organisation and how to manage and quantify them. To help quantify the risk, Value at Risk (VaR) techniques can be used to measure the risk of loss for investments, which helps to measure the financial risk.

2. Interest rate risk

Interest rates on borrowing have fluctuated greatly over the past. Companies can borrow money at either floating (variable) interest rates or at fixed interest rates. If they have floating rate borrowing, then clearly they are subject to the risk of future interest rate changes, which can impact the profits and cash flows of the entity.

For fixed interest borrowing it could appear that this carries no risk in that any later changes in the interest rate are irrelevant as the entity knows the future interest amounts and how this will impact profits and cash flow. However, there can still be a problem which is illustrated below.

Illustration

It is now 1 June. A company has decided that they will wish to take out a loan of £100,000 for six months, starting in 3 months time on 1 September.

If they were to take the loan today then the rate of interest that they would be charged is 10% p.a. (fixed).

The problem is that they are not taking the loan today but in 3 months time. If they do nothing then there is a risk that by the time they actually take the loan the rate of interest will have changed.

The risk that we are concerned about is therefore the risk of interest rates changing between now and the date the loan starts (not the risk of interest rates changing after the start of the loan – the loan will be taken at a fixed rate).

3. Currency risk

Globalisation has served to increase the amount of foreign trade which has in turn increased the amount of foreign currency transactions that companies have. Any dealing in foreign currency presents the problem of the risk of changes in exchange rates (currency risks).

The adoption in most of Europe of the single currency – the euro – has removed the problem for companies trading within Europe, but for trading with companies in other countries an important role of the financial manager is to look for ways of removing or reducing this risk.

Currency risk falls into three separate categories:

- Transaction risk
- Translation risk
- Economic risk

3.1. Transaction risk

This is the risk that a transaction in a foreign currency at one exchange rate is settled at another rate (because the rate has changed). It is this risk that the financial manager may need to manage and the methods of dealing with this risk ae covered in a later chapter (currency risk management).

3.2. Translation (or accounting) risk

This relates to the exchange profits or losses that result from converting foreign currency balances for the purposes of preparing the accounts.

These are of less relevance to the financial manager, because they are book entries as opposed to actual cash flows.

3.3. Economic risk

This refers to the change in the present value of future cash flows due to unexpected movements in foreign exchange rates. E.g. raw material imports increasing in cost.

4. Political risk

Political risk is the risk that political action will affect the position and value of a company.

Examples of macro (country specific) political risk:

- outbreak of war / civil unrest
- confiscation of assets (nationalisation) / restrictions on foreign ownership
- import quotas / tariffs
- exchange controls

Examples of micro (firm specific) political risk

These are risks that affect only certain firms in certain industries, rather than all foreign firms.

- minimum wage legislation
- pollution controls
- product legislation
- health and safety legislation

4.1 Managing political risk

(a) negotiate the environment prior to investing
  (i) negotiate an investment agreement
  (ii) obtain insurance (either privately or through the home government)
  (iii) gain local government support e.g. grants

(b) select risk reducing operating strategies
  (i) control distribution channels / transportation / technology (e.g. oil refining away from politically sensitive oil fields)
  (ii) ensure that some components are imported from the home country

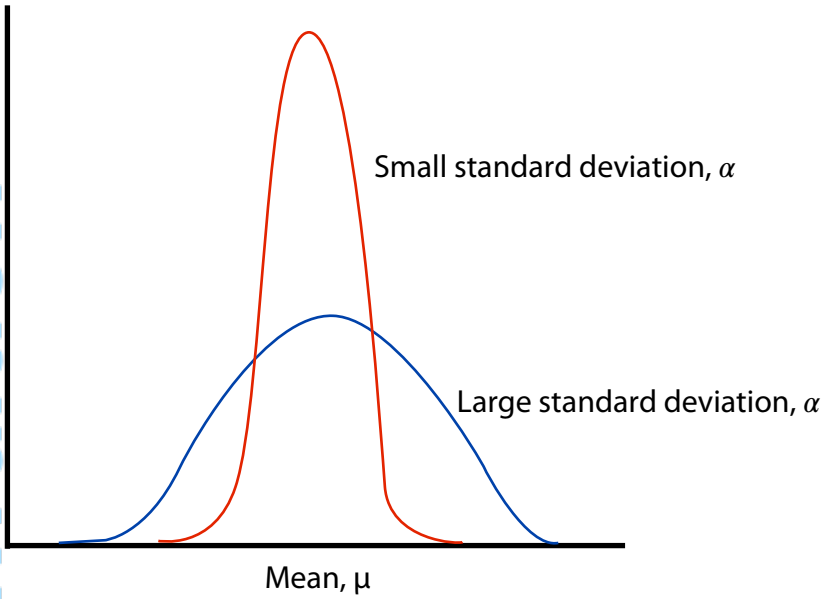
(c) marketing strategy
  (i) branding
  (ii) control of final product markets

(d) financial strategy
  (i) low equity base / large local debt
  (ii) multiple source (and therefore pressure) borrowing
  (iii) shared ownership / join venture with strong local partner

5. Value at risk – introduction

It is assumed that results from an investment or the value of a share portfolio has a mean (average) value but that results vary around that mean following a normal distribution curve. This will allow estimates to be made of the likelihood of possible outcomes.

Normal curves have the following general shape:



If the possible results are closely clustered around the mean the standard deviation of the distribution is small; if the results are very spread out, the standard deviation of the distribution is large.

So if the mean daily value of a share is $30 and the standard deviation of its value is $1 the share is rarely valued very far from $30. If, however, the standard deviation were $10, then the share's value would be very volatile, often worth more than, say, $40 and less than say $20.

Because all normal curves are of the same basic shape, they can be described using a set of tables, as set out below.

The area under the curve holds all possible results and the table gives the proportion of those results between the mean and Z standard deviations above (or below) the mean

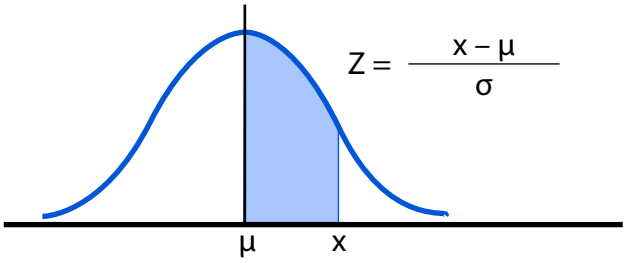
Note, Z is the distance above or below the mean expressed as a number of standard deviations, so for a value x, Z is:

$$Z = \frac{x - \mu}{\sigma}$$

So, if the mean height of a population was 178 cm with a standard deviation of 4cm, we can work out what proportion of the population is 178 – 181 cm tall.

$$Z = \frac{181 - 178}{4} = 0.75$$

Look up the table value for Z = 0.75 by going down the left hand column until you get to 0.7, then across until you get to 0.05 and the table figure is 0.2734. That means 27.34% of the population is in the height range 178 – 181 cm tall. Because the curve is symmetrical, the same proportion of people would be 175 – 178 cm tall.



Z	*0.00*	*0.01*	*0.02*	*0.03*	*0.04*	*0.05*	*0.06*	*0.07*	*0.08*	*0.09*
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990

The use of the tables can be turned round to answer a question such as in what height range are the 20% of who are people just taller than the mean. This means that the shaded area in the diagram shown as part of the table has to be 0.2 as that represents the 20% of people just taller than the mean.

To solve this go to the 'body' of the table and look for 0.2. You will see that this is somewhere between Z = 0.52 and 0.53 (areas = 0.1985 and 0.2019). In fact, 20% seems almost mid-way, so Z would be estimated at 0.525.

Using the formula at the top of the table:

$$Z = \quad 0.525 = \frac{x - 178}{4} = 0.75$$

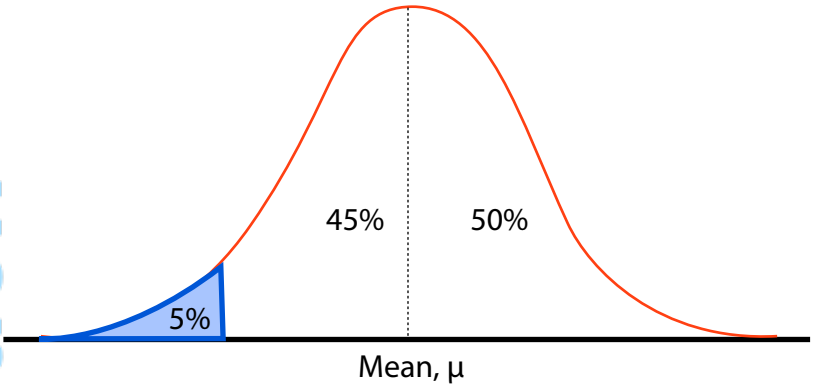
So,

$x - 178 = 4 \times 0.525 = 2.1.$

Therefore the 20% of people just taller than the mean of 178 cm will be in the height range 178 – 180.1 cm.

5.1. Value at risk – share values

What talking about value at risk, the commonest criterion is to work out the amount you could lose over a period so that there is only a 5% chance of losing more. This can be represented as follows on the curve:



We are looking for where the cut-off is to leave only the 5% lowest values.

Let's say that a shareholding has a mean value of $80,000 and the daily has a standard deviation of $5,000. The shareholding could easily have a value of $81,000, $78,000 and so on but you would have had some bad luck if tomorrow's value were only $60,000. However, that low value would be possible.

So, below what value would only 5% or results lie?

5% splits the left hand side of the curve into 5%/45%, or 0.05/0.45. The normal curve tables give the area under the curve from the mean down or the mean up so would indicate the Z value for an area of 0.45.

Looking at the body of the tables for an area of 0.45, you will see that Z = 1.645 (mid-way between 1.64 and 1.65).

$$Z = 1.645 = \frac{80{,}000 - x}{5{,}000}$$ (Z is the distance below the mean as a number of standard deviations)

5,000 x 1.645 = 80,000 – x

x = 80,000 – 5,000 x 1.645 = $71,775.

So, there is only a 5% chance that after one day the shares will be worth less than $71,775. There is a 95% chance that the shares will be worth more than that.

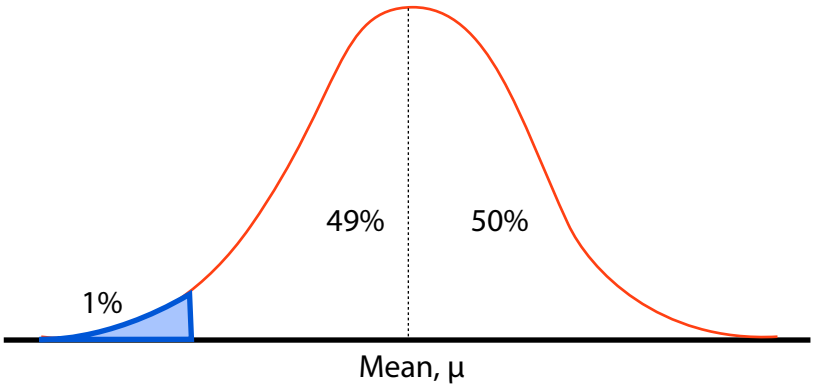
Another way of expressing that is to say that we are 95% confident that the shares will not be worth less than $71,775.

The **value at risk** (VAR) at the 95% confidence level is the maximum you stand to lose with a 95% confidence, so that figure is:

80,000 – 71,775 = $8,225

Alternatively, the value at risk is simply 1.645 x $5,000 = $8,225

If you were asked to calculate the VAR to the 99% confidence level, then you are splitting the curve into 0.01, 0.49, 0.50 areas



The 49% (or 0.49) area needs to be found in the body of the tables (remember tables only give the area from the mean up or down) and the Z value for 0.49 is about 2.33.

$Z = 2.33 = \frac{80{,}000 - x}{5{,}000}$ (Z is the distance below the mean as a number of standard deviations)

5,000 x 2.33 = 80,000 – x

x = 80,000 – 5,000 x 2.33 = 68,350

So, there is only a 1% chance of the shares being worth less than $68,350.

The value at risk to the 99% confidence level is 80,000 – 68,350 = $11,650

This means that there is only a 1% chance of the shares losing more than $11,650 in the course of a day.

5.2. Value at risk for several periods

The example above dealt with variations in share value over the course of a day and the standard deviation of $5,000 was for one day. But, what if we wanted to work out similar statistics for, say, a period of 10 consecutive days?

What we need now is a standard deviation for share value for 10 days.

The rule is (really you just have to learn this) is:

$\sigma_{period} = \sigma_{day} \sqrt{n}$

where n is the number of days in the period.

So, is the standard deviation of share value for 1 day is $5,000, for 10 days it would be:

$5,000 x $\sqrt{10}$ = 5,000 x 3.1623 = 15,881.

So the value at risk to the 95% confidence level over 10 days would be:

1.645 x $15,881 = $26,124

Obviously, the value at risk over ten days must be greater than over just one day as there could be a sequence of 10 days of 'bad luck'.

Chapter 9

CURRENCY RISK MANAGEMENT

1. Introduction

Increasingly, many businesses have dealings in foreign currencies and, unless exchange rates are fixed with respect to one another, this introduces risk.

Exchange rates move up and down for all sorts of reasons, such as:

- Political uncertainty
- Economic prospects of the country
- Demand for the currency

Many of these factors are unpredictable, but there are three calculations that can be performed to predict certain exchange rates and also to predict a country's exchange rate.

2. Interest rate parity

The different interest rates in countries can be used to predict the **forward** exchange rate. The forward exchange rate is the rate you would be quoted now for changing currency at a specific date in the future.

For example, say that the UK £ interest rate is 4% and the US $ rate is 6% and that the current exchange rate (the spot rate) is US$ 1.4 = £1.00

An investor might therefore see a way to make money by borrowing, say £1,000 at 4% in the UK, changing this into $1,400 and investing at 6% in the US. There seems to be a 2% margin in doing this.

However, the investor would not be sure of making money unless he or she knew how many £ they would get back at the end of the period. If the US$ at weakened to say £1 = $2, the investor might lose a lot of money. To prevent that, the investor could agree now a rate (a forward rate) at which to change back the US $ at the end of the period.

The forward rate must be a rate that means the investor would break-even (otherwise there would be the odd situation where people could make money, risk free, by simply borrowing and investing).

So, looking at a period of a year:

Borrow £1,000 add 1 year's interest @ 4% Amount owing becomes £1,040

Convert into US$ at 1.40$/£

Invest $1,400 add 1 year's interest @ 6% Amount available becomes $1,484

Interest rate parity theory says that the 1 year forward exchange rate is therefore 1,484/1,040 = 1.427 $/£

After, say two more years, interest would have accrued for three years and the forward exchange rate would be given by:

$1,400 \times (1.06)^3/1,000 \times (1.04)^3 = 1.4823$ $/£.

3. Purchasing power parity

In theory, this predict future spot rates.

The approach says that money obtains its value with reference to what it can buy. Therefore an exchange rate links what an item costs in two different currencies.

So if an item cost £1,000 in the UK and $1,500 in the US, then £1,000 must have the same value as $1,500 and the exchange rate is therefore $1.5/£.

After a year, the purchase prices will have risen in each country by their inflation rates. Say that in the UK inflation is 2% and in the US it is 3.5%. Then in a year, the product will cost:

(1) In the UK: 1,000 x 1.02 = £1,020

(2) In the US: 1,500 x 1.035 = $1,552.50

These amounts must be worth the same because they buy the same item. Therefore the exchange rate in 1 year is predicted to be:

1,552.5/1,020 = 1.522.

In four years the exchange rate would be predicted to be:

$1,500 \times (1.035)^4 / 1,000 \times (1.02)^4 = 1.59$ $/£

Example 1 – PPP (1)

An item currently costs £100 in the UK. The current exchange rate is $/£ 1.50.

The rates of inflation are 2% p.a. in the UK and 4% p.a. in the US.

Required

(a) Calculate the price of the item in 1 year's time in the UK and in the US

(b) As a result, calculate the exchange rate in 1 year's time?

Example 2 – PPP (2)

The exchange rate is currently $/£ 1.70. The inflation rate in the US is 5% p.a. and in the UK is 2% p.a.

Calculate the exchange rate be in:
(a) one year's time
(b) two years' time

4. International Fisher effect

This theory says that the real rate of interest is the same in every country and the interest rates quoted on bank accounts (the nominal or money rate) is a combination of this rate (the real rate) and the inflation rate.

1 + Nominal Rate = (1 + Real Rate) x (1 + Inflation Rate)

Say a country had in inflation rate of 2.5% and a nominal interest rate of 5%. If another country had an inflation rate of 6%, then we can predict its nominal rate of interest as follows:

1 + 0.05 = (1 + Real Rate) x (1 + 0.025)

1 + Real Rate = 1.05/1.025 = 1.02439

The nominal rate in the other country is therefore given by:

1 + Nominal Rate = (1.02439) x (1 + 0.06) = 1.08585

The nominal rate is therefore 8.585%

Remember, the nominal rate is higher when inflation is higher because money on deposit has to increase by inflation just to stand still with respect to inflation, then investors expect a real rate of interest on top ie they expect to be able to buy more even after inflation.

5. Cross rates

Cross rates allow you to work out the exchange rate between to currencies when their rate with respect to a third currency are known

For example, on 3 May 2016, published exchange rates were:

US$/£ = 1.45

€/£ = 1.26

We can therefore work out €/US$ as follows:

Look at what you want ie €/US$

€/US$ = €/£ x £/US$

£/US$ = 1/(US$/£)

So, €/US$ = 1.26 x 1/1.45 = 0.87

The published rate was indeed 0.87

6. Types of currency risk

There are three types of currency risk:

6.1. Economic risk.

The source of economic risk is the change in the competitive strength of imports and exports. For example, if a company is exporting (let's say from the UK to a Eurozone country) and the euro weakens from say €/£ 1.1 to €/£ 1.3 (getting more euros per pound sterling implies that the euro is less valuable, so weaker) any exports from the UK will be more expensive when priced in euros. So goods where the UK price is £100 will cost €130 instead of €130, making those goods less competitive in the European market.

Similarly, goods imported from Europe will be cheaper in sterling than they had been, so those goods will have become more competitive in the UK market. Note that a company can therefore experience economic risk even if it has no overt dealings with overseas countries. If competing imports can become cheaper you are suffering risk arising from currency rate movements.

Doing something to mitigate economic risk can be difficult – especially for small companies with limited overseas dealings. In general, the following approaches might provide some help:

- Try to export or import from more than one currency zone and hope that they don't all move together, or at least to the same extent. For example, over the three months 14 January 2010 to 14 June 2010 the €/US$ exchange rate moved from about €/$ 0.6867 to €/$ 0.8164. This means that € had weakened relative to the US $ (or US $ strengthening relative to the € by 19%). This would make it less competitive for US manufactures to export to a Eurozone country. In the same period the £/$ exchange rate moved from 0.6263 £/$ to 0.6783 £/$, a strengthening of the $ relative to £ of only about 8%. Trade from the US to the UK would not have been so badly affected.

- Make your goods in the country you are selling them in. Although raw materials might still be imported and affected by exchange rates, other expenses such as wages are in the local currency and not subject to exchange rate movements.

6.2. Translation risk.

This affects companies with foreign subsidiaries. If the subsidiary is in a country whose currency weakens, the subsidiary's assets will be less valuable in the consolidated accounts. Usually, this effect is of little real importance to the holding company because it does not affect its day-to day cash flows. However, it would be important if the holding company wanted to sell the subsidiary and remit the proceeds. It also becomes important if the subsidiary pays dividends. However, the term 'translation risk' is usually reserved for consolidation effects.

It can be partially overcome by funding the foreign subsidiary using a foreign loan. For example, take a US subsidiary that has been set up by its holding company providing equity finance. Its statement of financial position would look something like:

	$ million
Non-current assets	1.5
Current assets	0.5
	2.0
Equity	2.0

If the $ weakens then all of the $2 million total assets become less valuable.

However if the subsidiary were set up using 50% equity and 50% dollar borrowings, its balance sheet would look like:

	$ million
Non-current assets	1.5
Current assets	0.5
	2.0
$ Loan	1.0
Equity	1.0
	2.0

The holding company's investment is only $1 million and the company's net assets in US$ are only $1 million. If the $ weakens the only the net $1 million becomes less valuable.

6.3. Transaction risk.

This arises when a company is importing or exporting. If the exchange rate moves between agreeing the contract in a foreign currency and paying or receiving the cash, the amount of home currency paid or received will alter, making those future cash flows uncertain.

For example, in June a UK company agrees to sell an export to Australia for 100,000 Australian $, payable in three months. The exchange rate at the date of the contract is

AUD/£ 1.80 meaning that there are 1.80 AUD for every £.

Confusingly, this could also be written as

1£/AUD 1.80, where the key is noticing that it is '1£', meaning 1£ - 1.8AUD.

So the company is expecting to receive 100,000/1.8 = £55,556. If, however, the Australian $ weakened over the three months to become worth only 1£/AUD 2.00, then the amount that would be received would be worth only £50,000. Of course, if the Australian $ strengthened over the three months more than £55,556 would be received.

It is important to note in the following discussions that transaction risk management is not concerned with achieving the most favourable cash flow: it is aimed at achieving a definite cash flow as only then can proper planning be undertaken.

7. Dealing with transaction risks

Assuming that the business does not want to tolerate exchange rate risks (and that could be a reasonable choice for small transactions), transaction risk can be treated in the following ways:

(1) Invoice. Arrange for the contract and the invoice to be in your own currency. This will shift all exchange risk from you onto the other party. Of course, who bears the risk will be a matter of negotiation, along with price and other payment terms. If you are very keen to get a sale to a foreign customer you might have to invoice in their currency.

(2) Netting. If you owe your Japanese supplier 1 million ¥, and another Japanese company owes your Japanese subsidiary 1.1 million ¥, then by netting off group currency flows your net exposure is only for 0.1 million ¥. This will really only work effectively when there are many sales and purchases in the foreign currency. It would not be feasible if the transactions were separated by many months. Bilateral netting is where two companies in the same group cooperate as explained above; multilateral netting is where many companies in the group liaise with the group's treasury department to achieve netting where possible.

(3) Matching. If you have a sales transaction with one foreign customer then, a purchase transaction with another (but both parties operating with the same foreign currency) then this can be efficiently dealt with by opening a foreign currency bank account. For example:

1 November: should receive $2 million from US customer

15 November: must pay $1.9 million to US supplier.

Deposit the $2 million in a US $ bank account and simply pay the supplier from that. That leaves only US $0.1 million of exposure to currency fluctuations.

Usually for matching to work well, either specific matches are spotted (as above) or there have to be many import and export transactions to give opportunities for matching. Matching would not be feasible if you received $2 million in November, but didn't have to pay $1.9 million until the following May. There aren't many businesses that can simply keep money in a foreign currency bank account for months on end.

(4) Leading and lagging. Let's imagine you are planning to go to Spain and you believe that the euro will strengthen against your own currency. It might be wise for you to change your spending money into euros now. That would be 'leading' because you are changing your money in advance of when you really need to. Of course, the euro might weaken and then you'll want to kick yourself, but remember: managing transaction risk is not about maximising your income or minimising your expenditure, it is about knowing for certain what the transaction will cost in your own currency.

Let's say, however, you believe that the euro is going to weaken. Then you would not change your money until the last possible moment. That would be 'lagging', delaying the transaction.

Note however that this does *not* reduce your risk. The euro could suddenly strengthen and your holiday would turn out to be unexpectedly expensive. Lagging does not reduce risk because you still do not know your costs. Lagging is simply taking a gamble that your hunch about the weakening euro is correct.

(5) Forward exchange contracts. A forward exchange contract is a binding agreement to sell (deliver) or buy an agreed amount of currency at a specified time in the future at an agreed exchange rate (the forward rate).

In practice there are various ways in which the relationship between a current exchange rate (spot rate) and the forward rate can be described. Sometimes it is given as an adjustment to be made to the spot rate or the forward rates might be quoted directly. However, for each of spot and forward there is always a pair of rates given. For example:

Spot €/£ 1.2025 ± 0.03 ie 1.2028 and 1.2022

3 month forward rate €/£ 1.2020 ± 0.06 ie 1.2026 and 1.2014

One of each pair is used if you are going to change sterling to euros. So £100 sterling would be changed now for either €120.28 or €120.22. Guess which rate the bank will give you! You will always be given the exchange rate which leaves you less well off, so here you will be given a rate of 1.2022, if changing £ to euros now, or 1.2014 if using a forward contract. Once you have decided which direction one of the rates is for, the other rate is used when converting the other way. So:

		€ to £		**£ to €**
Spot	€/£	1.2028	–	1.2022
3 month forward rate	€/£	1.2026	–	1.2014

So, let's assume you are a manufacturer in Italy, exporting to the UK. You have agreed that the sale is worth £500,000, to be received in three months and wish to hedge (reduce your risk) against currency movements.

In three months you will want to change £ to € and you can enter a binding agreement with a bank that in three months you will deliver £500,000 and that the bank will give you £500,000 x 1.2014 = €600,700 in return. That rate and the number of euros you receive is now guaranteed irrespective of what the spot rate is at the time. Of course if the £ had strengthened against the € (say to €/£ = 1.5) you might feel aggrieved as you could have then received €750,000, but income maximisation is not the point of hedging: its point is to provide certainty and you can now put €600,700 into your cash flow forecast with confidence.

However, there remains here one lingering risk: what happens if the sale falls through after arranging the forward contract. We are not necessarily talking about a bad debt here as you might not have sent the goods, but you have still entered a binding contract to deliver £500,000 to your bank in three months' time. The bank will expect you to fulfil that commitment, and so what you might have to do is go to the bank, exchange enough € for £500,000, then immediately use that to meet your forward contract, receiving €600,700 back. This process is known as 'closing out', and you could win or lose on it depending on the spot rate at the time.

There is one other way that forward rates might be given and this is as an adjustment to the spot rates.

For example:

Spot rate	€/£	1.2501	–	1.2631
3 month forward margin		0.3c	–	0.4c pm

Here 'pm' appears after the margin. This means SUBTRACT the margin. Note that the margin is in cents.

If 'dis' had been after the margin, this means a discount and this would be ADDED to the spot rate.

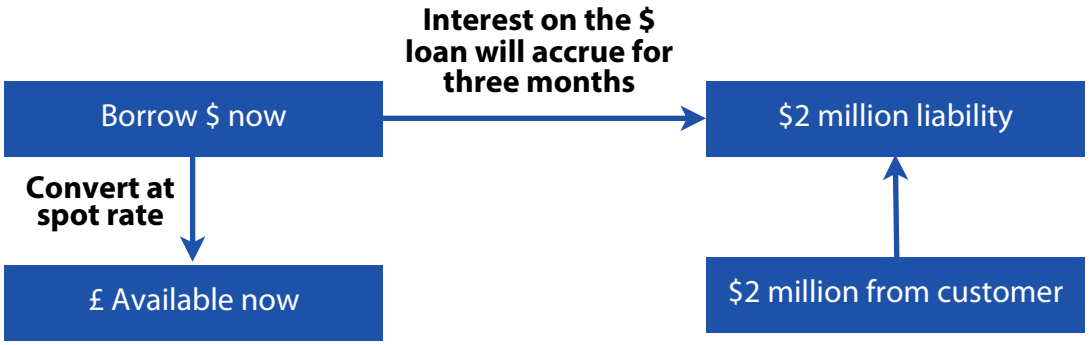
Note premium and discount appear to have the reverse meanings to normal. ADD a DISCOUNT, SUBTRACT a PREMIUM.

So in this example, the three month forward rate would be:

Spot rate	€/£	1.2501	–	1.2631
3 month forward margin		0.0030		0.0040 pm
		1.2471		1.2591

Forward contracts are known as **'over the counter'** arrangements. You have to meet with your bank and set up the contract on an individual basis/

(6) Money market hedging. Let's say that you were a UK manufacturer exporting to the US so that in three months you are due to receive $2 million. You would suffer no currency risk if that $2 million could be used then to settle a $2 million liability; that would be matching the currency inflow and outflow. However, you don't have a $2 million liability to settle then – so create one that can soak up the US $. You can create a $ liability by borrowing $ now and then repaying that in three months with the $ receipt. So the plan is:



To work out how many $ need to be borrowed now, you need to know $ interest rates. For example, the US$ 3 month interest rate might be quoted as:

0.54% – 0.66%

It is important to understand that, although this might be described as a '3 month rate' it is always quoted as an annualised rate. One rate is what you would earn interest at on a deposit, and the other the rate you would pay on a loan. Again, no prizes for guessing which is which: you will always be charged more than you earn. On the dollar loan we will be charged 0.66% pa for three months and the loan has to grow to become $2 million in that time. So, If X is borrowed now and three months' of interest is added:

X(1 + 0.66%/4) = 2,000,000

X = $1,996,705

This can be changed now from $ to £ at the current spot rate, say $/£ 1.4701, to give £1,358,210.

This amount of sterling is certain: we have it now and it does not matter what happens to the exchange rate in the future. Ticking away in the background is the US$ loan which will amount to $2 million in three months and which can then be repaid by the $2 million we hope to receive from our customer. That is the hedging process finished because exchange rate risk has been eliminated

Why might this somewhat complicated process be used instead of a simple forward contract? Well, one advantage is that we have our money now rather than having to wait three months for it. If we have the money now we can use it now – or at least place it in a sterling deposit account for three months. This raises an important issue when we come to compare amounts received under forward contracts and money market hedges. If these amounts are received at different times they cannot be directly compared, because receiving money earlier is better than receiving it later. To compare amounts under both methods we should see what the amount received now would become if deposited for three months. So, if the sterling 3 month deposit rate were 1.2%, then placing £1,358,210 on deposit for three months would result in:

£1,358,210 (1 + 1.2%/4) = £1,362,285

It is this amount that should be compared to any proceeds under a forward contract.

The example above dealt with hedging the receipt of an amount of foreign currency in the future. If foreign currency has to be paid in the future, then what the company can do is change money into sufficient foreign currency now and place it on deposit so that it will grow to be the required amount by the right time. Because the money is changed now at the spot rate, the transaction is immune from future changes in the exchange rate.

Money market hedging is also an over-the counter operation.

8. Further methods of exchange risk hedging

There are two other methods of exchange risk hedging which you are required to know. They involve the use of derivatives: financial instruments whose value derives from the value of something else – like an exchange rate.

8.1. Currency futures.

Simply think of futures contracts as items you can buy and sell on the futures market and whose price will closely follow the exchange rate.

- Currency futures are standardised contracts for the sale or purchase at a set future date of a set quantity of currency.
- Contracts have a market price and they can be bought and sold on the futures market. The market prices follows the exchange rate approximately.
- Losses or profits can be made on futures trading

To hedge: do the same to the futures now [Buy/sell] as you would do to the currency in the future

Let's say that a US exporter is expecting to receive €5 million in three months and that the current exchange rate is $/€1.24. Assume that that is also the price of $/€ futures. The US exporter will fear that the exchange rate will weaken over the three months, say to $/€1.10 (that is fewer dollars for a euro). If that happened then the market price of the future would decline too, to around 1.1. The exporter could arrange to make a compensating profit on buying and selling futures: sell now at 1.24 and buy later at 1.10. Therefore any loss made on the main the currency transaction is offset by the profit made on the futures contract.

This approach allows hedging to be carried out using a market mechanism rather than entering into individual tailored contracts that the forward contracts and money market hedges required. However, this mechanism does not offer anything fundamentally new.

Illustration 1 – Payment of foreign currency

Weetwood Co is in the US and needs £5m on 30 September Spot today (1/8) is: $/£ 1.5134 – 1.5352. September $/£ futures are available. The price today is 1.5423. The spot and the futures prices both increase by 0.04 as at 30/9.

Remember, do to futures now (buy/sell) that you will do to the currency later.

	$M
If exchanged at spot rate £5m would cost £5m x 1.5352	7.676
If exchanged at rate at 30/9, $5m would cost £5m x 1.5752 (ie 1.5352 +0.4)	7.876
Loss on underlying transaction	(0.200)
Profit on futures contract (buy now at 1.5423, sell on 30/9 at 1.5823) $5m x (1.5823 – 1.5423)	0.200
Net gain/loss	NIL

Note: if the exchange rate had moved the other way, the profit on the exchange rate would be offset by a loss on the futures contract.

Illustration 2 – Receipt of foreign currency

Weetwood Co is in the US and will receive £10m on 30/9. Spot today (1/8) is: $/£ 1.5134 – 1.5352. September $/£ futures are available. The price today is 1.5423. The spot and the futures prices both increase by 0.04 as at 30/9.

Remember, do to futures now (buy/sell) that you will do to the currency later.

	$M
If exchanged at spot rate £10m would cost £10m x 1.5134	15,134
If exchanged at rate at 30/9, £10 would give £10m x 1.5534 (ie 1.5134 + 0.04)	15,534
Gain on underlying transaction	0.200
Loss on futures contract (sell now at 1.5423, buy on 30/9 at 1.5823) $5m x (1.5823 – 1.5423)	0.200
Net gain/loss	NIL

Practical points relating to futures

- All futures are priced in US $, eg US $/£ or US $/€
- Contracts are standard sizes: £ = £62,500; € = 125,000; Japanese Yen = 12.5m
- All contracts of standard maturity
- A tick is the smallest movement of a contract price and is 0.0001 of the contract
- Value of tick = 0.0001 x contract size (€ contract, tick = $12.50 NB priced in $).
- Choose nearest whole number of contracts.
- Choose first expiry contract date after the transaction
- To enter the contract, have to pay a margin up-front (like a deposit).

Example 3

1/6: UK company agrees to sell goods to the US for $500,000, to be settled 30/11

1/6: spot rate $/£ = 1.5732 – 1.5745.

Sterling futures: contract size £62,500;

Tick size = $6.25. Prices are as shown in the table:

Settlement date	*Price $/£*
Jun	1.5480
Sept	1.5245
Dec	1.5136

Assume spot rate on 30/11 is 1. 71 – 1. 75 and the futures price then is 1.6997.

Show how the transaction could be hedged by setting up a futures contract.

The hedge is not perfect because:

- The number and value of contract is not an exact fit to the transaction
- There is basis risk, meaning that futures prices do not stay perfectly in line with spot rates.

8.2. Options

Options are radically different. They give the holder *the right, but not the obligation,* to buy or sell a given amount of currency at a fixed exchange rate (the exercise price) in the future. (If you remember, forward contracts were binding.)

The right to sell a currency at a set rate is a ***put*** option (think: you 'put' something up for sale); the right to buy the currency at a set rate is a ***call*** option.

Suppose a UK exporter is expecting to be paid US$ 1 million for a piece of machinery to be delivered in 90 days. If the £ strengthens against the US$ the UK firm will lose money, as it will receive fewer £ for the US$ 1million. However, if the £ weakens against the US$, then the UK company will gain additional money. Say that the current rate is $/£ 1.40 and that the exporter will get particularly concerned if the rate moved beyond $/£1.50. The company can buy £ call options at an exercise price of $/£ = 1.50, giving it the right to buy £ at $1.50/£. If the dollar weakens beyond $/$1.50, the company can exercise the option thereby guaranteeing at least £666,667. If the US$ stays stronger – or even strengthens to say $/£1.20, the company can let the option lapse (ignore it) and convert at 1.20, to give £833,333.

This seems too good to be true as the exporter is insulated from large losses but can still make gains. But there's nothing for nothing in the world of finance and to buy the options the exporter has to pay an up-front, non-returnable premium. Options can be regarded just like an insurance policy on your house. If your house doesn't burn down you don't call on the insurance, but neither do you get the premium back. If there is a disaster the insurance should prevent massive losses.

Options are also useful if you are not sure about a cash flow. For example, say you are bidding for a contract with a foreign customer. You don't know if you will win or not, so don't know if you will have foreign earnings, but want to make sure that your bid price will not be eroded by currency movements. In those circumstances, and option can be taken out: used if necessary or ignored if you do not win the contract or currency movements are favourable.

Example 4

A company is importing goods costing $200,000 from the US. The current exchange rate is €/$ 0.75 payment to be made in 3 months. The company buys a three month option for €4000 at an exercise price of €/$ 0.77.

What will the total cost of the import be if the exchange rate is:
€/$ 0.70?

€/$ 0.80?

8.3. Option pricing

There are two elements to the price of an option:

- Intrinsic value
- Time value

The intrinsic value is determined by the exercise price compared to the current price of the underlying asset.

For example: a put option allowing you to sell an asset at $5 when the current market price of the asset is $4, gives an intrinsic value of $1.

Similarly: a call option at an exercise price of $7 when the actual purchase price if $10 gives an intrinsic value of $3.

In the two examples above, the option would be said to be 'in the money'. A put option at an exercise price of $6 when the market price is $7 is 'out of the money' and has no intrinsic value.

The time value related to the length of time that the option lasts and therefore what protection it might offer against adverse price movements. Think of how you would be prepared to pay more for an insurance policy if:

- The period of the insurance increased; and/or
- The volatility of the underlying security increased (greater volatility implies more protection is given by the option).

In addition the value of a call option increases if general interest rates increase because the call option allows you to safely defer purchase and to keep your money earning interest for longer.

Chapter 10

INTEREST RATE RISK MANAGEMENT

1. Introduction

Risk arises for businesses when they do not know what is going to happen in the future, so obviously there is risk attached to many business decisions and activities.

Interest rate risk arises when businesses do not know:

- how much interest they might have to pay on borrowings, either already made or planned;

or

- how much interest they might earn on deposits, either already made or planned.

If the business does not know its future interest payments or earnings, then it cannot complete a cash flow forecast accurately. It will have less confidence in its project appraisal decisions because changes in interest rates will alter the weighted average cost of capital and the outcome of net present value calculations.

There is, of course, always a risk that if a business had committed itself to variable rate borrowings when interest rates were low, a rise in interest rates might not be sustainable by the business and that liquidation becomes a possibility.

Note carefully that the primary aim of interest rate management (and indeed currency rate management) is not to guarantee a business the best possible outcome, such as the lowest interest rate it would ever have to pay. The primary aim is to limit the uncertainty for the business so that it can plan with greater confidence.

2. Traditional and basic approaches

2.1. Matching and smoothing

When taking out a loan or depositing money, businesses will often have a choice of variable or fixed rates of interest. Variable rates are sometimes known as floating rates and they are usually set with reference to a benchmark such as LIBOR, the London Interbank Offered Rate. For example, LIBOR +3%.

If fixed rates are available then there is no risk from interest rate increases: a $2 million loan at a fixed interest rate of 5% per year will cost $100,000 per year. Although a fixed interest loan would protect a business from interest rates rises, it will not allow the business to benefit from interest rates decreases and a business could find itself locked into high interest costs and thereby losing competitive advantage.

Similarly if a fixed rate deposit were made a business could be locked into disappointing returns.

Smoothing

In this simple approach to interest rate risk management the loans or deposits are simply divided so that some are fixed rate and some are variable rate. Looking at borrowings, if interest rates rise, only the variable rate loans will cost more and this will have less effect than if all borrowings had been at variable rate. Deposits can be similarly smoothed.

There is no particular science about this. The business would look at what it could afford, its assessment of interest rate movements and divide its loans or deposits as it thought best.

Matching

This approach requires a business to have both borrowed and deposited money. The closer the two the amounts the better.

For example, let's say that the deposit rate of interest is LIBOR + 1% and the borrowing rate is LIBOR + 4%, and that $500,000 is deposited and $520,000 borrowed. Assume that LIBOR is currently 3%.

Currently:

Annual interest paid = $520,000 x (3 + 4)/100 = $36,400

Annual interest received = $500,000 (3 + 1)/100 = $20,000

Net cost = $16,400

Now assume that LIBOR rises by 2% to 5%

New interest amounts:

Annual interest paid = $520,000 x (5 + 4)/100 = $46,800

Annual interest received = $500,000 (5 + 1)/100 = $30,000

Net cost = $16,800

The increase in interest paid has been almost exactly offset by the increase in interest received. The extra $400 relates to the mismatch of the borrowing and deposit of $20,000 x increase in LIBOR of 2% = $20,000 x 2/100 = $400.

3. Asset and liability management

This relates to the periods for which loans (liabilities) and deposits (assets) last. The issues raised are not confined to variable rate arrangements because a company can face difficulties where amounts subject to fixed interest rates or earnings mature at different times.

Say, for example, that a company borrows using a ten-year mortgage on a new property at a fixed rate of 6% per year. The property is then let for five years at a rent that yields 8% per year. All is well for five years but then a new lease has to be arranged. If rental yields have fallen to 5% per year, the company will start to lose money.

It would have been wiser to match the loan period to the lease period so that the company could benefit from lower interest rates – if they occur.

4. Forward rate agreements (FRA)

These arrangements effectively allow a business to borrow or deposit funds as though it had agreed a rate which will apply for a period of time. The period could, for example start in 3 months' time and last for 9 months after that. Such an FRA would be termed a 3 – 12 agreement because is starts in 3 months and ends after 12 months. Note that both parts of the timing definition start from the current time.

The loans or deposits can be with one financial institution and the FRA can be with an entirely different one, but the net outcome should provide the business with a target, fixed rate of interest. This is achieved by compensating amounts either being paid to or received from the supplier of the FRA, depending on how interest rates have moved.

Technically, if you are **b**orrowing, you **b**uy an FRA; if you are depositing money you would sell an FRA.

FRAs are 'over the counter' instruments

Example 1

Nero Plc's cash flow forecast shows that it will have to borrow $2 million from Goodfellow's Bank in 4 months' time for a period of 3 months. The company fears that by the time the loan is taken out, interest rates will have risen. The current interest rate is 5% and this is offered by Helpy Bank on the required FRA.

Required

(a) What FRA is needed?

(b) Show the cash flows if the interest rate has risen to 6.5% when the loan is taken out

(c) Show the cash flows if the interest rate has fallen to 4% when the loan is taken out

5. Interest rate derivatives

The interest rate derivatives that will be discussed are:

- Interest rate futures
- Interest rate options
- Interest rate caps, floors and collars

5.1. Interest rate futures

Futures contracts are of fixed sizes and for given durations. They give their owners the right to earn interest at a given rate, or the obligation to pay interest at a given rate.

Selling a future creates the obligation to *borrow* money and the obligation to *pay interest*

Buying a future creates the obligation to *deposit* money and the right to *receive interest.*

Interest rate futures can be bought and sold on exchanges such as LIFFE, the London International Financial Futures Exchange.

The price of futures contracts depends on the prevailing rate of interest and it is crucial to understand that as interest rates rise, the market price of futures contracts falls. In fact, the price of a futures contract is 100 – the interest rate.

Think about that and it will make sense: say that a particular futures contract allows borrowers and lenders to pay or receive interest at 5%, which is the current market rate of interest available. Now imagine that the market rate of interest rises to 6%. The futures contract has become less attractive to buy because depositors can earn 6% at the market rate but only 5% under the futures contract. The price of the futures must fall.

Similarly, borrowers will now have to pay 6% but if they sell the future contract they have to pay at only 5%, so the market will have many sellers and this reduces the selling price until a buyer-seller equilibrium price is reached.

- A rise in interest rates reduces futures prices.
- A fall in interest rates increases futures prices.

Remember: price of the futures contract = 100 – interest rate.

Interest rate option contracts are for fixed amounts (typically £500,000) last for only **3 months.** So to obtain cover for a £3m loan for 6 months the number of contracts needed would be

£3m/£0.5m x 6 months/3 months = 12 contracts.

In practice, futures price movements do not move perfectly with interest rates so there are some imperfections in the mechanism. This is known as **basis risk.**

The approach used with futures to hedge interest rates depends on two parallel transactions:

- Borrow/deposit at the market rates
- Buy and sell futures in such a way that any gain that the profit or loss on the futures deals compensates for the loss or gain on the interest payments.

Borrowing or depositing can therefore be protected as follows:

Depositing and earning interest

The depositor fears interest rates falling as this will reduce income.

If interest rates fall, futures prices will rise, so *buy* futures now (at the relatively low price) and *sell* later (at the higher price). The gain on futures can be used to offset the lower interest earned.

Of course, if interest rates rise the deposit will earn more, but a loss will be made on the futures (bought at a relatively high price then sold at a lower price).

As with FRAs, the objective is not to produce the best possible outcome but to produce an outcome where the interest earned plus the profit or loss on the futures deals is stable.

Borrowing and paying interest

The borrower fears interest rates rising as this will increase expense.

If interest rates rise, futures prices will fall, so *sell* futures now (at the relatively high price) and *buy* later (at the lower price). The gain on futures can be used to offset the lower interest earned.

Students are often puzzled by how you can sell something before you have bought it. Simply remember that you don't have to deliver the contract when you sell it: it is a contract to be fulfilled in the future and it can be completed by buying in the future.

Of course, if interest rates fall the loan will cost less, but a loss will be made on the futures (sold at a relatively low price then bought at a higher price).

Once again, the aim is stability of the combined cash flows.

Summary

The summary rule for interest rate futures is:

- Depositing: buy futures then sell
- Borrowing: sell futures then buy

Example 2

Today is 3 October, and interest rates are 8% p.a. X plc will wish to borrow $6M for 6 months starting on 1 January. 3 month January interest rate futures are available at 92.00.

Show how interest rate futures may be used to hedge the risk, and calculate the outcome on 1 January.
(Assume that on 1 January interest rates have changed to 10% and the futures price to 90.00)

The contracts last for only **three months** so the interest gain/loss is for ¼ of a year. (Earlier we had used 6/3 to account for 6 months coverage).

So the profit on futures will be 12M x (92% - 90%)/4 or 12M x (92 - 90)/400.

5.2. Interest rate options

Interest rate options allow businesses to protect themselves against adverse interest rate movements whilst allowing them to benefit from favourable movements. They are also known as interest rate guarantees. Options are like insurance policies:

(1) You pay a premium to take out the protection. This is non-returnable whether or not you make use of the protection.

(2) If interest rates move in an unfavourable direction you can call on the insurance.

(3) If interest rates move favourable you ignore the insurance.

Options are taken on interest rate futures and they give the right, but not the obligation, either to buy the futures or sell the futures at an agreed price at an agreed date.

Interest rate option contracts are for fixed amounts (typically £500,000) last for only **3 months.** So to obtain cover for a £3m loan for 6 months the number of contracts needed would be

£3m/£0.5m x 6 months/3 months = 12 contracts.

Using options when borrowing

As explained above, if using simple futures the business would sell futures now then buy later.

When using options, the borrower takes out an option to sell a future at today's price (or another agreed price). Let's say that price is 95. An option to sell is known as a **put** option (think about putting something up for sale).

If interest rates rise the futures price will fall, let's say to 93. Therefore the borrower will buy at 93 and will then choose to **exercise** the option by exercising their right to sell at 95. The gain on the options is used to offset the extra interest that has to be paid.

If interest rates fall the futures price will rise, let's say to 97. Obviously, the borrower would not buy at 97 then exercise the option to sell at 95, so the option is allowed to **lapse** and the business will simply benefit from the lower interest rate.

Using options when depositing

As explained above, if using simple futures the business would buy futures now then sell later.

When using options, the investor takes out an option to buy at today's price (or another agreed price). Let's say that price is 95. An option to buy is known as a **call** option.

If interest rates fall the futures price will rise, let's say to 97. The investor would therefore sell at 97 then **exercise** the option to buy at 95. The gain on the options is used to offset the lower interest that has been earned.

If interest rates rise the futures price will fall, let's say to 93. Obviously the investor would not sell futures at 93 and exercise the option by insisting on their right to sell at 95. The option is allowed to **lapse** and the investor enjoys extra income form the higher interest rate.

Options therefore give borrowers and lenders a way of guaranteeing minimum income or maximum costs whilst leaving the door open to the possibility of higher income or lower costs. These 'heads I win, tails you lose' benefits have to be paid for and a non-returnable **premium** has to be paid up front to acquire the options.

5.3. Interest rate caps, floors and collars

Interest rate cap:

A cap involves using interest rate futures options to set a maximum interest rate for borrowers. If the actual interest rate is lower, the option is allowed to lapse. This is simply the explanation above of using an option when borrowing and the borrower would buy a put option.

Interest rate floors:

A floor involves using interest rate futures options to set a minimum interest rate for investors. If the actual interest rate is higher the investor will let the option lapse. This is simply the explanation above of using options wen depositing and the investor would buy a call option.

Interest rate collar:

A collar involves using interest rate options to confine the interest paid or earned within a pre-determined range. A **borrower would buy a cap (buy a put) and sell a floor (sell a call)**, thereby offsetting the cost of buying a cap against the premium received by selling a floor. Note this is the first time we have dealt with selling an option: previously we have bought puts or calls.

Selling the call option allows the other party to insist on receiving interest at a minimum rate. If actual rates are lower than this, we will end up having to pay that person interest – hence a floor is set for us as borrowers.

A depositor would buy a floor and sell a cap.

6. Interest rate swaps

In interest rate swaps: two parties agree to exchange interest payments with each other over an agreed period.

- There have to be advantages to both parties.
- The advantages usually arise because the parties are offered different terms for fixed and floating rate loans and these differences can be exploited.

For example:

Company A can borrow at a fixed rate of 8% or at a variable rate of LIBOR + 2%

Company B can borrow at a fixed rate of 9% or at a variable rate of LIBOR + 5%.

Company A wants to have a fixed rate loan and Company B wants a variable rate loan.

Show how both companies can borrow from an interest rate swap.

If each company borrows the type of loan it wants, Company A will borrow fixed at 8% and Company B will borrow variable at LIBOR + 5%.

The total interest bill will be: LIBOR + 5% + 8% = LIBOR + 13%

If they borrow in the ways they don't want, Company A will borrow variable at LIBOR + 2% and Company B will borrow fixed at 9%.

The total interest bill will be: LIBOR + 2% + 9% = LIBOR + 11%.

There is therefore a 2% difference that the companies should be able to exploit by borrowing in the ways they don't want then swapping the interest rate payments so that they pay fixed/variable as they wish.

They can split the 2% advantage in whatever way they want to. In the following solution it has been assumed that they enjoy 1% each, so at the end of the swap, Company A will be paying fixed rate interest but at 8 – 1 = 7%, and Company B will be paying variable rate interest but at LIBOR + 4%.

	Company A		*Company B*
Borrow in the way that will open up the advantage	(LIBOR + 2%)		(9%)
Swap the variable rate	LIBOR + 2%	←	(LIBOR + 2%)
Swap a fixed rate	(7%)	→	7%
	(7%)		(LIBOR + 4%)

In practice there are many ways in which the swap could take place, but the key is to ensure that each party ends up better than they would have if borrowing what they wanted directly.

In this example, two companies cooperated without any intermediary. In practice, this matchmaking can be difficult to bring off as each company needs to find another it trusts with complementary needs. Instead, swaps are often arranges directly with a bank, or through a bank which will either pay or accept LIBOR in exchange for fixed interest. The bank will take a cut.

For example:

Company A: Fixed rate 10%, or LIBOR + 1% [prefers to borrow fixed]

Company B: Fixed rate 9% or LIBOR + 0.5% [prefers to borrow variable]

If they borrow in the way they prefer the total interest bill will be: 10% + LIBOR + 0.5% = LIBOR + 10.5%

If they borrow 'the other way', the total interest bill will be: LIBOR + 1% + 9% = LIBOR + 10%.

So there is 0.5% to play for.

Instead of swapping directly they go through a bank that will pay LIBOR to Company A in exchange for 8.8% fixed, and will accept LIBOR from Company B in exchange 8.6% interest.

Note that with regard to the bank, the LIBOR in and out have cancelled, but the bank receives 8.8% from Company A and pays only 8.6% to Company B, thus making a profit.

The position can be shown as:

The final position is:

Company A pays: LIBOR + 1% + 8.85 – LIBOR = 9.80 [better than direct fixed borrowing of 10%]

Company B pays: 9% + LIBOR - 8.6% = LIBOR + 0.4% [better than direct variable borrowing of LIBOR + 0.5%]

Between them the companies save (10 – 9.8) + (0.5 – 0.4) = 0.3

The bank earns 0.2%

D: BUSINESS VALUATION

Chapter 11

IMPLICATIONS OF ACQUISITIONS, MERGERS AND DIVESTMENTS

1. Introduction

In this chapter we will discuss briefly the reasons why a company may wish to merge with, or take over, another company, and consider associated issues.

2. Acquisitions and mergers

An acquisition or merger should increase shareholder's wealth via:

(1) Acquiring the target company at an undervalue

Or:

(2) Synergistic benefits:

- Economic efficiency gains
- Economies of scale (volume related savings)
- Economies of scope (complementary resources)
- Financial synergy
- Reduced total risk will not benefit well-diversified shareholders (the systematic risk is not reduced by diversification) but reducing total risk may reduce insolvency risks and hence borrowing costs
- Increased asset backing may bolster borrowing capacity
- Exploiting tax losses sooner
- Market power
- Acquiring monopolistic powers (e.g. eliminate competition)
- Acquisition of a scarce resource
- Dynamic management
- Innovative product
- Cash mountain
- To enter a new market quickly

Acquisitions and mergers can be classified as either:

Horizontal integration – acquisition of a company in the same industry

Vertical integration – acquisition of a company of a company before or after it in the supply chain.

3. Competition authorities

Due to the existence of well-developed capital markets it is comparatively easy to launch takeovers in the UK and the US. To prevent monopolies forming, the US has strong anti-trust legislation and the UK has the Competition and Markets Authority (CMA).

In continental Europe and Japan, banks (rather than shareholders) have traditionally taken a more direct role in financing and directing corporate activity. Other stakeholders such as employees and suppliers have also been more influential.

However, the growth of global capital markets has seen the market for corporate control expand into Europe and the Far East. If capital is to be attracted to markets then there must be attractive investment opportunities available to it.

The following are examples of the general principles of the City Code:

(1) All shareholders of the same class must be treated the same and given the same information

(2) Sufficient relevant information and time must be given to shareholders

(3) Once an offer is made, directors cannot frustrate it without shareholders approval

(4) General offer to all other shareholders is required if the predator acquires control

4. Predator issues on takeover

4.1. The investment decision

- How much is the target worth to the predator?
- Are the target shareholders willing to sell?
- What economic / industry and company assumptions underline the valuation?

4.2. The financing decision

(1) Matching

has the predator adequate surplus cash / borrowing capacity / ability to issue shares?

can the group service the new finance required for the acquisition?

(2) Cost

will the use of cash or shares change the predator's capital structure for better or worse?

(3) Capital providers

will any existing debt covenants or existing shareholder expectations be affected?

could the predator issue convertibles to delay control dilution issues?

is the current dividend policy desirable / sustainable after the acquisition?

will the EPS be affected, and does it matter?

4.3. Market issues

Often target companies are over-valued because of:

- Over optimism with regard to economies of scale
- The victim's share price anticipating synergistic gains
- The victim's share price may be 'bid up' in an auction

5. Target issues on takeover

- What is the target worth to the predator – can we extract maximum value?
- What is the target worth to us?
- Do we want to sell?
- What is the after personal tax value of the offer?
- If the offer is in shares, are they attractive?

5.1. Market issues

The target company shareholders are the ones who must approve the offer. Generally, most of the benefits on a takeover accrue to the target company shareholders.

5.2. Defensive tactics

(1) Provide more information

Contest the offer on terms of being a poor offer, having no obvious advantage, and / or employee opposition

Issue forecasts to indicate that the sale of the shares is not a good option

Revalue the assets

Advertise (subject to the City Code)

(2) Lobby to have the offer referred to the Competition Commission

(3) Stop shares falling into the predator's hands

Find a White Knight (an alternative bidder who would be more acceptable)

Arrange a management buyout

(4) Poison Pill tactic, whereby the target builds in a tripwire to make itself less attractive. E.g. create a new class of stock which automatically becomes redeemable at a high price in the event of a take-over.

6. Debtholder versus shareholder interests

Debtholders may benefit from a merger of two firms if this results in a 'co-insurance effect'. – i.e. the larger firm is less liable to insolvency than the separate firms. This will increase the value of that debt at the expense of shareholders.

Chapter 12

DIVESTMENTS

1. Introduction

This chapter examines exit strategies and their implications. These include divestments and MBOs (which became increasingly popular in the 1980's) and any conflicts of interest that may arise.

2. Demergers, sell-offs, unbundling and asset stripping

All of these involve splitting a company into two or more businesses. With a demerger existing shareholders are given shares in each of the two separate businesses – control is maintained.

Under a 'sell-off', at least part of the business will be sold to a third party. Control is lost, but funds are raised.

Under a 'spin-off', a new independent company is created from the parent, possibly to allow focus on higher growth parts of the business, and shares issues to existing shareholders of the parent. The new company can be worth more as an independent entity than as part of the group but there is a risk of share price volatility, particularly if shareholders decide to sell the shares in the new business.

'Unbundling' means to take apart the components of a company with the intention of disposing of part or all of the parts separately at a higher price than the whole. This would usually be done via a 'sell-off'. When done following a takeover it is termed 'asset stripping'.

3. Why demerge or sell?

- To focus on core competence
- To react to changes in strategic focus
- To sell off unwanted assets
- To capture 'revers synergy' resulting from an existing 'conglomerate discount'
- To remove 'co-insurance benefits' from debtholders
- To meet regulatory requirements

4. Management buyouts

A management buyout is the purchase of all or part of a business from its owners by one or more of its executive managers

A management buy-in is where a team (usually assembled by a venture capitalist) identify a target company to take-over.

A buy-in / buy-out is where a team is drawn from a combination of the existing management and experts appointed via the venture capitalist.

4.1. Parties to a buyout

- Management team
- Directors of the company
- Financial backers of the management team (often including a venture capitalist)

4.2. Reasons for a buyout

A buyout can be looked at from both the buyout team's point of view and the seller's point of view as each one will have differing reasons for wishing to proceed with the buyout.

4.3. From the buyout teams' point of view:

- To obtain ownership of the business rather than remain as employee, which allows better management of the business
- To avoid redundancy when the business is threatened with closure

4.4. From the seller's point of view

- To dispose of part of the company that does not fit in with the overall strategy of the company whilst raising cash.
- To dispose of a loss-making segment of the business which the directors do not have time or inclination to turn around
- It is often easier to arrange a management buyout than to try and sell off parts of a business in the open market
- It may well avoid redundancy costs, strike action if closure if the only alternative

4.5. Why may buyouts generate shareholder value?

- Personal motivation of the buyout team
- A more hands-on approach to management
- Keener decision making on such areas as pricing and debt collection
- Savings in head office overheads

4.6. Possible problems

The main problem is likely to be the lack of experience of the management team in actually running all aspects of the business. Obviously the more experience they have the better, and the more likely they are to be able to find financial backing.

Other problems include:

- Tax and legal complications
- Motivation of other employees not party to the buyout
- Lack of additional finance once the buyout has taken place
- Maintenance of previous commitments made by the company to the workforce or other parties
- Loss of key employees and economies of scale

4.7. Providers of capital

- Clearing banks (usually 'senior debt')
- Merchant banks
- Pension funds
- Venture capital (who require a high return!)
- Government agencies

5. Going private

All the listed shares of a company are bought by a small group of investors, and the company is de-listed. The benefits of going private are as follows:

- Both direct and indirect listing costs are saved
- A hostile takeover bid is impossible
- A small number of shareholders reduces the agency problem

Chapter 13

ENTITY VALUATION – THEORETICAL APPROACH

1. Introduction

In this chapter we will look at what, in theory, determines the market value of equity and of debt. It is this theory which forms the basis for most of the arithmetic that is generally required in the examination in questions on this area.

In practice many other factors are likely to be relevant. These will be covered in the next chapter, and although important they are more relevant for discussion questions than for computations.

2. The valuation of equity – constant dividends

The market value of a share is effectively determined by the shareholders – it is the price that shareholders are prepared to pay for a share on the stock exchange.

In theory, the amount that shareholders are prepared to pay depends on two factors:

- the dividends that they expect to receive in the future
- the rate of return that shareholders require

Example 1 – Valuation of equity (1)

Alpha plc has in issue $1 shares and has just paid a dividend of 20c per share. Dividends are expected to remain constant. Shareholders required rate of return is 10% p.a.

Calculate the current market value per share

Example 2 – Valuation of equity (2)

Beta plc has in issue $0.50 shares and has just paid a dividend of 15c per share. Dividends are expected to remain constant. Shareholders required rate of return is 12%.

Calculate the current market value per share

In both the above examples, the company had just paid a dividend, and therefore anyone buying the share would have to wait for a year until they were to receive their first dividend (in the examination we ignore the possibility of interim dividends). We call this situation an 'ex-div' valuation.

Suppose, however, that the company was about to pay a dividend. This would mean that someone buying the share would receive a dividend virtually immediately (in addition to all the future dividends). Therefore, the price that they will be prepared to pay will be higher by the amount of the dividend about to be paid. We call this situation a 'cum div' valuation.

Market value cum div = market value ex div + dividend about to be paid

Example 3 – Valuation of equity (3)

Beta plc has in issue $0.50 shares and is about to pay a dividend of 15c per share. Dividends are expected to remain constant. Shareholders required rate of return is 12%.

Calculate the current cum div market value per share and ex div market value per share.

Although we can use this model for any future dividend stream, you will only be expected to deal with constant dividends, or (more likely) the situation where dividends are expected to grow at a constant rate.

3. The valuation of equity – constant growth rate in dividends

We can use the dividend valuation model to derive a formula for the market value of a share. The proof of this is not in the examination syllabus – you are only expected to be able to use the following formula:

$$P_0 \text{ (ex-div)} = \frac{D_0 (1 + g)}{(k_e - g)}$$

where:

D_0 = the current dividend

k_e = the shareholder's required rate of return

g = the expected rate of growth in dividends

Example 4 – Valuation of equity (4)

Gamma plc has just paid a dividend of 30c per share. Dividends are growing at the rate of 4% p.a. The shareholder's required rate of return is 15% p.a.

Calculate the market value per share.

Example 5 – Valuation of equity (5)

Epsilon plc has just paid a dividend of 40c per share. Dividends are growing at the rate of 6% p.a. The shareholder's required rate of return is 20% p.a.

Calculate the market value per share.

In practice, it is unlikely that dividends will grow at a constant rate. However, appreciate that the market value is based on the dividends that shareholders expect to receive. Shareholders are perhaps more likely to expect an average rate of growth p.a. than expect that the dividends will grow at different specific rates each year.

In the examination you will only be expected to deal with constant rate of growth and therefore to use the formula.

4. The valuation of equity – discounted cash flow

The free cash flow is the cash available for distribution to lenders and shareholders. It can be calculated from accounting information as follows:

Profit before interest and tax (operating profit)	X
Add: Depreciation (non-cash)	X
Less: Investment in non-current assets	(X)
Less: Investment in working capital	(X)
Less: Tax	(X)
FREE CASH FLOW	X

The value of the business can then be found by discounting the free cash flows at the weighted average cost of capital, and the value of equity is then found by deducting the value of debt.

The free cash flow to equity is the cash available for distribution to shareholders, taking into account the free cash flows after payment of interest to the debt holders.

The value of equity is then calculated by discounting the free cash flows to equity at the cost of equity.

Example 6 – Free cash flows

Kappa has recently published its financial statements and extracts reveal the following information:

	$000s
Investment in working capital	185
Investment in non-current assets	420
Depreciation	120
Operating profit	935
Interest	170
Dividends	150

Kappa's company profits are currently taxed at 20%

Calculate the free cash flow and free cash flow to equity of Kappa.

It is also possible to use discounting techniques in similar ways to those used in the dividend valuation methods, to arrive at the value of equity.

Example 7 – Free cash flow valuation (1)

Sigma has free cash flows to equity of $6.5 million and they are expected to grow at 2% per annum indefinitely.

The company has weighted average cost of capital of 5% and a cost of equity of 8%.

The capital structure is as follows:

	$000s
Equity ($1)	5,000
Debentures	1,000

The debentures are currently trading at $90%.

Calculate the value of a Sigma share

Example 8 – Free cash flow valuation (2)

The financial manager of Omega has prepared the following schedule of forecast free cash flows to equity for the next three years:

	Year 1	*Year 2*	*Year 3*
Free cash flows to equity ($'000s)	340	410	450

The cash flows at year 3 are expected to grow at 2% indefinitely for the foreseeable future.

Calculate the equity value of Omega, assuming that the shareholders' expected return is 8%.

5. The valuation of debt

Here we are talking about traded debt. This is debt borrowing that is traded on a stock exchange and therefore has a market value.

Unless you are told otherwise, debt is traded in units of $100 nominal and is referred to as 'debentures', 'loan stock', or 'bonds' – they are essentially different words for the same thing.

Debt (in the examination) carries a fixed rate of interest, but this is based on the nominal value of the debt. This rate of interest is known as the coupon rate. The market value at any time will depend on the rate of return that investors are currently requiring.

The basis of valuation is, in theory, exactly the same as for equity:

The market value of debt is the present value of future expected receipts discounted at the investors required rate of return.

5.1. The valuation of debt – irredeemable debt

Irredeemable debt is debt that is never repaid. The holder of this debt will simply receive interest each year for ever (unless they choose to sell it on the stock exchange, in which case the purchaser will continue to receive the interest).

Example 9 – Valuation of irredeemable debt (1)

P plc has in issue $500,000 10% irredeemable debentures. Investors currently require a return of 8% p.a.

Calculate the market value of the debt.

The answer that we have calculated is an ex-interest market value – as before, the cum-interest value would be the ex-interest value plus any interest about to be received. However, again, we always assume values to be ex-interest unless told otherwise.

The market value of irredeemable debt can be expressed as a formula as follows:

$$P_0 \text{ (ex-int)} = \frac{I}{k_d}$$

Where:

I = the interest per annum on $100 nominal

k_d = the investors required rate of return

Example 10 – Valuation of irredeemable debt (2)

Q plc has in issue $1,000,000 6% irredeemable debentures. Investors currently require a return of 12% p.a.

Calculate the market value of the debt?

5.2. The valuation of debt – redeemable debt

In practice, debt is not irredeemable but redeemable which means that the company will repay the borrowing at some specified date in the future.

The valuation of redeemable debt is the one place where there is no formula and where we have no choice but to use first principles and discount the future cash flows to present value at the investor's required rate of return.

Example 11 – Valuation of redeemable debt (1)

R plc has in issue $400,000 8% debentures redeemable in 5 years' time at a premium of 10%. Investors require a return of 12% p.a.

Calculate the market value of the debt.

Example 12 – Valuation of redeemable debt (2)

S plc has in issue $1,000,000 7% debentures redeemable in 4 years' time at par. Investors require a return of 10% p.a.

Calculate the market value of the debt.

Chapter 14

ENTITY VALUATION – PRACTICAL ISSUES

1. Introduction

We have looked at the theoretical valuation of securities but for various reasons the theory does not work perfectly in practice.

In this chapter we look at the limitations of the theory and consider practical issues.

2. Limitations of the dividend valuation model

Although expected future dividends and the shareholders required rate of return certainly do impact upon the market value of shares, it would be unrealistic to expect the theory to work perfectly in practice.

Main reasons for this include:

- The stock exchange is not perfectly efficient, and therefore the market value of a share may be distorted from day-to-day by factors such as rumours about a takeover bid.
- In practice, market values do not change instantly on changes in expectations – the speed at which the market value changes depends on the volume of business in the share.
- The model only deals with constant growth in dividends. In practice this may not be the case. However, do appreciate that the growth used in the model is the future growth that shareholders are expecting – this is perhaps more likely to be at a constant rate. The big problem is determining the rate of growth that shareholders expect! It is clearly impossible to ask them and to any estimate that we make for our calculations is only an estimate and course be completely different from the rate of growth that shareholders are in fact expecting.

3. Financial accounts based valuations of equity

Other common, practical approaches to valuing shares in unquoted companies are:

3.1. Net assets basis

The value of the entity is based upon the value of the net assets in its financial statements.

A problem of this valuation is on what basis to value the net assets.

The following basis can be considered:

- Realisable value – this would only be sensible if the company was about to be wound up
- Replacement value – this would be more sensible from the point of view of another company considering making an offer for the shares in our company. However, it would be ignoring the value of any goodwill.
- Book value – this is normally of little relevance, since the book values of assets are unlikely to even approximate to the actual values.

Further issues are the value of intangibles that may not be recognised in the financial statements and contingent liabilities that are not recognised either. If the values of both are included, it will impact the value of the net assets.

This valuation method is the minimum value of an entity but can be an appropriate valuation technique for a capital intensive business.

3.2. Earnings basis

This approach uses the price earnings ratio of a similar quoted company, which can then be applied to the earnings of the target company to calculate a value of the entity.

Market value per share = P/E ratio x EPS

For example, if the latest set of accounts for a publishing company show earnings per share of 50c, and quoted publishing companies currently have P/E ratios of 18, then the price per share for our company would be 50c × 18 = $9 per share.

If the predator company believes that it can improve the earnings of the target company it may choose to use a higher P/E ratio to apply to the target company's earnings, commonly using its own P/E ratio. This process is referred to as bootstrapping.

Example 1 – P/E valuation (1)

Dory has 10 million shares in issue and has made profits after tax of $550,000 for the year, with operating profits of $790,000.

Calculate the value per share using a P/E valuation, assuming an appropriate P/E ratio of 12.

Example 2 – P/E valuation (2)

Nemo has 1 million shares in issue and has recently declared a dividend of $4 million, giving it a dividend cover of 3.

Calculate the value per share using a P/E valuation, assuming an appropriate P/E ratio of 10.

Example 3 – P/E valuation (3)

Woody has a P/E ratio of 8 and earnings of $600,000. Woody is looking to acquire Buzz, which has a P/E ratio of 6 and earnings of $450,000.

The estimated new P/E ratio of the combined entity is 9 and post-tax synergy savings of $100,000 are anticipated.

Calculate how much Woody should pay to acquire the entire share capital of Buzz.

4. Intangible asset valuations

To calculate the value of a company's intangible assets the calculated intangible value (CIV) approach is commonly adopted. The calculation involves comparing the company's return on assets with the industry average and any excess is deemed to be attributable to the company's intangible assets.

Example 4 – CIV

Peppa has the following information which is relevant to be able to calculate the calculated intangible value.

Tangible assets	$1.85m
WACC	8%
K_e	10%
Earnings	$0.58m
Industry return on tangible assets	12%
Tax rate	20%

Calculate the value of Peppa's intangibles using the CIV approach.

Chapter 15

PRICING ISSUES AND POST-TRANSACTION ISSUES

1. Introduction

This chapter considers the forms of consideration for acquisitions as well as the methods and implications of financing a cash offer.

It also addresses the option available with regards the debt acquired as part of the acquisition and issue that arise post-acquisition.

2. Consideration

The predator company can acquire the target company shares using the following forms of consideration:

- Cash
- Shares
- Earn-out arrangements

The consideration can be through just a cash or share offer in isolation or a combination of two different forms of consideration.

2.1. Cash consideration

A cash consideration for the purchase of the target shares is beneficial to the target shareholders as they are guaranteed a certain sum, however they no longer have an interest in the entity itself and will also be subject to tax on the disposal of the shares.

The predator company is faced with the issue of raising cash, so needs to ensure adequate cash resources are available to finance the acquisition.

2.2. Share for share exchange

A share for share exchange is commonly used as a method of acquiring the shares in the target company as it removes any liquidity issues from the predator company perspective. The predator company needs to be aware that on issue of shares there will be loss of ownership once shares are granted to the target company shareholders.

The target company shareholders will own shares in the enlarged entity following the share exchange and so still have a vested interest in the performance of the business. Furthermore, there is the possibility of deferring any gains on disposal of the target company shares.

2.3. Earn-out arrangements

An earn-out arrangement is whereby the selling entity's owners receive some consideration in the future based upon the future performance of the entity. If the entity does not meet the targets set the consideration is not received.

3. Target entity debt

On acquisition of the target company the debt within the business can either be settled, providing there are sufficient cash stock piles within the combined business or the debt can be refinanced following the acquisition.

4. Post-transaction issues

Following the acquisition of the target company the integration of the two businesses is vitally important. If the integration fails, then there is likely to be a negative impact on the combined entity's share price.

Failure of takeovers can arise from numerous issues but the most common are as follows:

- Poor management of the integration process
- Lack of synergistic benefits

Chapter 16

SYSTEMATIC RISK AND THE CAPITAL ASSET PRICING MODEL (CAPM)

1. Introduction

In valuing an entity consideration needs to be given to the business risk faced by the shareholders and how best to calculate a return required by the shareholders for the business risk faced.

The ideas of business risk consisting of systematic and unsystematic risk are introduced whilst looking at the importance of the systematic risk in relation to the return given by quoted shares.

The meaning and derivation of the Capital Asset Pricing Model (CAPM) is covered and then discuss its relevance to project appraisal

NOTE:

For the whole of this chapter we will ignore the effect of gearing and therefore assume throughout that we are dealing with companies that are financed entirely from equity.

2. Business risk

Shares in some companies are viewed as inherently more risky than shares in other companies because of the nature of their business is more risky. As a result, the potential fluctuations in profits (and hence dividends) in the future are greater. If things go well shareholders may well receive much higher dividends, but the risk is that things may go badly in which case they will receive much lower dividends. The greater the potential fluctuations in returns, the greater we say that the risk is.

There are two different reasons why one company may be more risky than another:

- **Unsystematic risk (or company specific risk)**

  This is risk due to factors within the particular company, such as poor labour relations or the appointment of a new management director.

- **Systematic risk (or market risk)**

  This is risk due to general economic factors, such as the level of inflation or changes in the exchange rate.

A shareholder can 'remove' the unsystematic risk by creating a portfolio of shares on the basis that although each share individually has unsystematic risk, it 'cancels out' with the risk of other shares in the portfolio. We say that a well-diversified portfolio is one where the unsystematic risk has been completely removed. (i.e. diversified away)

Systematic risk exists in all companies and cannot be removed – all companies will be affected by, for example, the level of inflation. However, the level of systematic risk depends on the type of business and will be different for different types of business.

Although each individual shareholder may not hold a well-diversified portfolio of shares, we assume that shareholders overall are well-diversified and that it is shareholders overall who

determine the return given by a share (because it is they who determine the market value of the share). Capital Asset Pricing Model assumes therefore that it is the level of systematic risk that determines the required return from an investment.

3. Capital asset pricing model (CAPM)

There are several ways in which we could attempt to measure the systematic risk of an investment, but the standard way is to measure it relative to the risk of the stock exchange as a whole. The stock exchange index is the average of all the shares on the stock exchange, and is risky (in that it fluctuates). Some shares fluctuate more that the average, whereas some fluctuate less that the average.

We use β to measure the systematic risk, and β is defined as being the systematic risk of the investment as a proportion of the risk of the market (or stock exchange) as a whole.

- If an investment has a β of 1, it has 1 times the risk of the market – i.e. it has the same risk as the market.
- If an investment has a $\beta > 1$, then it is more risky than the market.
- If an investment has a $\beta < 1$, then it is less risky than the market.
- If an investment has a β of 0, then it has zero risk, or we say that it is risk-free.

In practice, no investment is completely without risk, but we assume that short-term government securities are effectively risk-free.

3.1. CAPM formula

As stated earlier, we assume that investors overall are well-diversified, and that therefore it is the level of systematic risk that will determine the required return.

The following formula is given to you in the examination:

$$E(r_i)=R_f + \beta_i (E(r_m) - R_f)$$

where:

R_f = the risk-free rate, and

$E(r_m)$ = the return from the market

Example 1 – CAPM (1)

Q plc has a β of 1.5. The market is giving a return of 12% and the risk free rate is 5%.

What will be the required return from Q plc?

Example 2 – CAPM (2)

R plc has a β of 0.8. The market is giving a return of 16% and the risk free rate is 8%.

What will be the required return from R plc?

Example 3 – CAPM (3)

S plc is giving a return of 20%. The stock exchange as a whole is giving a return of 25%, and the return on government securities is 8%.

What is the β of S plc?

3.2. CAPM and investment appraisal

If the financial manager is considering an investment in a new project, then since it is shareholders's money that is being invested, the investment should be appraised in the same way as would shareholders if they were investing their money directly.

As a result, the required return from the project (and hence the discount rate) should be calculated from the β of the project.

Example 4 – CAPM and investment appraisal

T plc is all equity financed. It wishes to invest in a project with an estimated β of 1.4, which is significantly different from the business risk characteristics of T's current operations.

The project requires an outlay of $100,000 and is expected to generate returns of $15,000 p.a. in perpetuity.

The market return is 11% and the risk free rate is 6%.

Estimate the minimum return that T will require from the project and assess whether or not the project is worthwhile.

3.3. Limitations of CAPM

The two main limitations of CAPM are as follows:

it is difficult to estimate the β of a project accurately. Generally we use the β of a company operating in the same type of business as the project, which restricts it to large projects

the theory of CAPM was developed as just a single period model, whereas in practice most investment projects will be expected to continue for more than one year.

3.4. Alpha values

We have already stated that even assuming that CAPM 'works' in practice, it would be unrealistic in the real world to expect that it works precisely at each moment in time. Even if it does work overall, it will not be surprising if some days the actual return is a little higher than it should be, and some days a little lower.

The alpha value is simply the difference between the actual return and the theoretical return (using CAPM).

Example 5 – Alpha values

D plc has a β of 0.6 and is giving a return of 8%. The market return is 10% and the risk free rate is 4%.

What is the alpha value of D plc?

3.5. Geared and ungeared β 's

Until now, we have been ignoring gearing and assuming that the companies in our examples have been all equity financed. In this case the risk of a share is determined solely by the risk of the actual business.

If, however, a company is geared, then a share in that company becomes more risky due to the gearing effect.

If, therefore, we are given the β of a share in a geared company, then the gearing in that company will have made the β higher than it would have been had there been no gearing. The β of a share measures not simply the riskiness of the actual business but also includes the gearing effect.

We therefore need to be careful when comparing the β's of shares in different companies. A higher β certainly means that the share is more risky, but it may be due to the fact that the company is more highly geared, or due to the fact that the business is inherently more risky, or a combination of the two!

The formula for removing the gearing effect is given in the examination and is:

$$\beta_a = \left[\frac{V_e}{(V_e + V_d(1-T))}\beta_e\right] + \left[\frac{V_d(1-T)}{(V_e + V_d(1-T))}\beta_d\right]$$

where: β_a is the ungeared β (also knows as the asset β or earnings β)

β_e is the geared β (also known as the equity β or share β)

V_e and V_d are the market value of equity and debt

β_d is the β of debt

Note that although you are given this formula in full in the examination, unless told otherwise, we normally assume that debt is risk free and that therefore βd = 0, which makes the formula much easier.

Example 6 – Geared and ungeared βs

P plc has a gearing ratio (debt to equity) of 0.4 and the β of its shares is 1.8.

Q plc has a gearing ratio of 0.2 and the β of its shares is 1.5.

The rate of corporation tax is 30%.

Required

(a) which is the more risky share?

(b) which company has the more risky business activity?

3.6. CAPM, business risk and project appraisal

If the shareholders of a company are well-diversified, then their shares in this company are just part of their overall portfolio.

If the company is to invest the shareholders's money in a new project, then the project should be appraised in the same way as the shareholders themselves would appraise the investment if they were invested their money in it directly.

If they were investing directly, then they would base their required return simply on the β of that investment (not on how it related to any particular other investment in their portfolio).

Therefore, when the company is appraising a new project they should calculate the β of the project, determine the required return for that β, and appraise the project at that required return.

How to calculate the β of a project? Find a similar quoted company and use the β of that company (ungeared if relevant).

Example 7 – Geared and ungeared βs

X plc is an oil company with a gearing ratio (debt to equity) of 0.4. Shares in X plc have a β of 1.48.

They are considering investing in a new operation to build ships, and have found a quoted shipbuilding company – Y plc. Y plc has a gearing ratio (debt to equity) of 0.2, and shares in Y plc have a β of 1.8.

The market return is 18% and the risk free rate is 8%.

Corporation tax is 25%

Required

At what discount rate should X plc appraise the new project, if it is to be financed

(a) entirely from equity.

(b) by equity and debt in the ratio 50%/50%.

(c) by debt and equity in the same ratio as that currently existing in X plc.

Chapter 17

EFFICIENT MARKET HYPOTHESIS (EHM)

1. Introduction

An efficient market is one in which the market price of all securities traded on it reflects all the available information. A **perfect market** is one which responds immediately to the information made available to it.

An efficient and perfect market will ensure that quoted share prices are as fair as possible, in that they accurately and quickly reflect a company's financial position with respect to both current and future profitability.

2. The Efficient Market Hypothesis

The Efficient Market Hypothesis (EMH) considers whether market prices reflect all information about the company. Three potential levels of efficiency are considered.

- **Weak-form efficiency:**

  Share prices reflect all the information contained in the record of past prices. Share prices follow a random walk and will move up or down depending on what information about the company next reaches the market.

  If this level of efficiency exists it should not be possible to forecast price movements by reference to past trends, however an analysis of public information would allow a trader to beat the market.

- **Semi-strong form efficiency:**

  Share prices reflect all information currently publicly available and so the price will alter only when new information is published.

  If this level of efficiency has been reached, price movements could only be forecast if unpublished information were known. This would be known as insider dealing.

- **Strong-form efficiency:**

  Share prices reflect all information, published and unpublished, that is relevant to the company.

  If this level of efficiency has been reached, share prices cannot be predicted and gains through insider dealing are not possible as the market already knows everything.

  Given that there are still very strict rules outlawing insider dealing, gains through such dealing must still be possible and therefore the stock market is at best only semi-strong form efficient.

3. EMH and the implications for financial managers

- **The timing of new issues**

  Unless the market is fully efficient the timing of new issues remains important. This is because the market does not reflect all the relevant information, and hence advantage could be obtained by making an issue at a particular point in time just before or after additional information becomes available to the market.

- **Project evaluation**

  If the market is not fully efficient, the price of a share is not fair, and therefore the rate of return required from that company by the market cannot be accurately known. If this is the case, it is not easy to decide what rate of return to use to evaluate new projects.

- **Creative accounting**

  Unless a market is fully efficient creative accounting can still be used to mislead investors.

- **Mergers and takeovers**

  Where a market is fully efficient, the price of all shares is fair. Hence, if a company is taken over at its current share value the purchaser cannot hope to make any gain unless economies can be made through scale or rationalisation when operations are merged. Unless these economies are very significant an acquirer should not be willing to pay a significant premium over the current share price.

- **Validity of current market price**

  If the market is fully efficient, the share price is fair. In other words, an investor receives a fair risk/return combination for his investment and the company can raise funds at a fair cost. If this is the case, there should be no need to discount new issues to attract investors.

ANSWERS

A: Financial policy decisions

Chapter 1

Financial and non-financial objectives

Answer 1 – Financial objectives

Not-for-profit entities are least concerned with a growth in earnings as their primary objective is to provide a service for its customers.

Answer 2 – For-profit and not-for-profit

For-profit are concerned with maximising wealth for the shareholders through profit generation.

Not-for-profit are concerned with fulfilling the service that they are to provide.

Answer 3 – Ratio calculation

$$g = \sqrt[n]{\frac{E_0}{E_n}} - 1$$

$$g = \sqrt[3]{\frac{(17.2/150)}{(10.4/100)}} - 1$$

$$g = 3.3\%$$

Answer 4 – Gearing

$$\text{Gearing} = \frac{0.97 \times 1{,}500{,}000}{\$1.74 \times 1{,}000{,}000}$$

$$= 83.6\%$$

Answer 5 – Return on equity

$$\text{ROCE} = \frac{\text{PBIT}}{\text{Capital employed}} = \frac{\$19.5\text{m}}{\$18\text{m} + \$138\text{m}} = 12.5\%$$

$$\text{ROE} = \frac{\text{PFY}}{\text{Capital employed}} = \frac{\$12.5\text{m}}{\$138\text{m}} = 9.1\%$$

Answer 6 – Annual return to investors

$$\text{Annual return} = \frac{\text{Capital growth + Annual dividend}}{\text{Share price at start of the year}}$$

$$= \frac{(\$2.54 - \$2.35) + \$0.15}{\$2.35}$$

$$= 14.5\%$$

Answer 7 – Earnings yield

$$\text{P/E} = \frac{\text{Price per share}}{\text{Earnings per share}}$$

$$= \frac{\$2.50}{\$0.52}$$

$$= 4.8$$

Kenny's P/E ratio is less than that of its main competitor indicating that the markets anticipate the competitors' future growth being better than that of Kenny's.

$$\text{Earnings yield} = \frac{\text{Earnings per share}}{\text{Price per share}}$$

$$= \frac{\$0.52}{\$2.50}$$

$$= 21\%$$

Answer 8 – Dividend ratios

$$\text{Divided yield} = \frac{\text{Dividend per share}}{\text{Price per share}}$$

$$= \frac{\$0.15}{\$1.84}$$

$$= 8.2\%$$

$$\text{Dividend cover} = \frac{\text{Earnings per share}}{\text{Dividend per share}}$$

$$= \frac{\$43.8\text{m}/100\text{m}}{\$0.15}$$

$$= 2.9 \text{ times}$$

$$\text{Dividend pay out} = \frac{\text{Dividend per share}}{\text{Earnings per share}}$$

$$= \frac{\$0.15}{\$43.8\text{m}/100\text{m}}$$

$$= 34.2\%$$

$$\text{P/E} = \frac{\text{Price per share}}{\text{Earnings per share}}$$

$$= \frac{\$1.84}{\$43.8\text{m}/100\text{m}}$$

$$= 4.2$$

Answer 9 – Economic variables

	$ million		$ million
Revenue	134.2	X 0.85	114.1
Operating costs	(67.6)	X 1.05	(71.0)
Operating profit	66.6		43.1
Interest	(8.2)	= 5% x $100m	(5.0)
Profit before tax	58.4		38.1
Tax	(14.6)	@22%	(8.4)
Earnings	43.8		29.7

Earnings have fallen by 32.2% (= [29.7 – 43.8]/43.8).

Chapter 2

Sustainability and Integrated reporting

Answer 1 – Non-financial objectives

Non-financial objectives are a reduction in staff turnover of 10%, a reduction in the company's carbon footprint, an increase in company charitable donations, and a reduction in the number of staff sick days below national average.

Answer 2 – Global Reporting Initiative (1)

The general standard disclosures are:

- Strategy and analysis
- Organisational profile
- Identified material aspects and boundaries
- Stakeholder engagement
- Report profile
- Governance
- Ethics and integrity

Therefore the management approach is not part of the general standard disclosures.

Answer 3 – Global Reporting Initiative (2)

All of the answers except the management approach are part of the general standard disclosures.

Answer 4 – The Capitals

Human and intellectual are part of the six capitals.

The other five capitals are social and relationship, natural, financial and manufactured.

Answer 5 – The Guiding Principles

Materiality, conciseness, and reliability and completeness are part of the guiding principles. The other ones are strategic focus and orientation, connectivity and information, stakeholder relationships, and consistency and comparability.

Chapter 3

Financial Management Policy Decisions

Answer 1 – Financing decision

$$\text{Interest cover} = \frac{\text{PBIT}}{\text{Interest}}$$

$$= \frac{\$16.5\text{m}}{(\$40\text{m} \times 5\%) + (\$25\text{m} \times 4\%)}$$

$$= 5.5 \text{ times}$$

As the interest cover is better than that contained within the covenant, Skelton is still compliant with the covenant.

B: Sources of long-term finance

Chapter 4

Changes in capital structure

Answer 1 – M&M assumptions

M&M's 1963 theory assumed that a company is liable to tax but not its shareholders.

Answer 2 – M&M formulae

(a) Cost of equity

$$k_{eg} = k_{eu} + [k_{eu} - k_d]\left[\frac{V_D[1-t]}{V_E}\right]$$

$$k_{eg} = 0.15 + [0.15 - 0.08]\left[\frac{0.4[1-0.3]}{1}\right]$$

$$k_{eg} = 16.69\%$$

(b) Weighted average

Before

$$WACC = k_{eu}\left[1 - \left(\frac{V_D t}{V_E + V_D}\right)\right]$$

$$WACC = k_{eu} = 15\%$$

After

$$WACC = k_{eu}\left[1 - \left(\frac{V_D t}{V_E + V_D}\right)\right]$$

$$WACC = 0.15\left[1 - \left(\frac{0.4 x 0.3}{0.6 + 0.4}\right)\right]$$

$$WACC = 13.2\%$$

Chapter 5

Long-term debt finance

Answer 1 – Interest rate swaps (1)

Company X has absolute advantage as it can borrow cheaper in both the fixed and variable markets.

Company X has the better advantage in the variable market so should borrow variable and therefore Company Y should borrow in the fixed market.

1. Calculate the savings

With the swap

Company X	LIBOR + 3%
Company Y	12%
	LIBOR + 15%

Without the swap

Company X	10%
Company Y	LIBOR + 6.5%
	LIBOR + 16.5%

Therefore, savings with the swap are 1.5%

2. Split the savings

Savings are split 50:50 so each company saves 0.75% interest.

3. Demonstrate how the swap works

Company X		*Company Y*
(LIBOR + 3%)	Borrows	(12%)
(6.25%)	X pays Y fixed	6.25%
LIBOR	Y pays X variable	(LIBOR)
(9.25%)	Outcome	(LIBOR + 5.75%)

Answer 2 – Interest rate swaps (2)

Company A has absolute advantage as it can borrow cheaper in both the fixed and variable markets.

Company A has the better advantage in the fixed market so should borrow fixed and therefore Company B should borrow in the variable market.

1. Calculate the savings

With the swap

Company A	10%
Company B	LIBOR + 1.5%
	LIBOR + 11.5%

Without the swap

Company A	LIBOR + 1.5%
Company B	11%
	LIBOR + 12.5%

Therefore, savings with the swap are 1%

2. Split the savings

Savings are split 50:50 so each company saves 0.5% interest.

3. Demonstrate how the swap works

Company A		Company B
(10%)	Borrows	(LIBOR + 1.5%)
(LIBOR)	A pays B variable	(LIBOR)
9%	B pays A fixed	(9%)
(LIBOR + 1%)	Outcome	(10.5%)

Answer 3 – Convertibles

(a) (i) If the shares are worth $4 per share in 2019 the total value of shares would be $80 ($4 x 20 shares) and so the holder of the instrument would opt for the cash as it is worth more.

(ii) If the shares are worth $6 per share in 2019, the total value of shares would be $120 ($6 x 20 shares) and so the holder of the instrument would opt for the shares as they are worth more.

(b) (i) Current market value - $100 nominal value

T	*Narrative*	*CF*	*DF@10%*	*PV*
1-3	Interest	8	2.487	19.90
3	RV	110.2 (W)	0.751	82.76
				102.66

Workings

Expected share price is 3 years' time = $4.50 × (1.07)3 = $5.51

Debenture holders will therefore be expected to convert and receive $110.20 (20 × $5.51) in 3 years' time.

(ii) Conversion Premium

Market value (b)(i)	$102.66
Parity value = 20 × $4.50	$90.00
(i.e. value of converting at current share price)	
Conversion premium	$12.66

Answer 4 – Lease vs Buy

Cash flows – Buy

	0	*1*	*2*	*3*	*4*	*5*
Cost	(100,000)					
Scrap					10,000	
Tax saved (W)		7,500	5,625	4,219	3,164	6,492
Net cash flow	(100,000)	7,500	5,625	4,219	13,164	6,492
DF @ 7%	1	0.935	0.873	0.816	0.763	0.713
P.V.	(100,000)	7,012	4,911	3,443	10,044	4,629

NPV = (69,961)

Cash flows – Lease

	0	*1*	*2*	*3*	*4*	*5*
Lease	(35,000)	(35,000)	(35,000)	(35,000)		
Tax saved			10,500	10,500	10,500	10,500
Net cash flow	(35,000)	(35,000)	(24,500)	(24,500)	10,500	10,500
DF @ 7%	1	0.935	0.873	0.816	0.763	0.713
P.V.	(35,000)	(32,725)	(21,388)	(19,992)	8,011	7,486

NPV = (93,608)

The decision should therefore be to buy the machine, as it is cheaper in present value terms

Workings - Capital allowances (bought)

T		*$*		*Tax saved*
0	Cost	100,000		
	C.A.	25,000	× 30%	7,500
		75,000		
1	C.A.	(18,750)	× 30%	5,625
		56,250		
2	C.A.	(14,062)	× 30%	4,219
		42,188		
3	C.A.	(10,547)	× 30%	3,164
		31,641		
4	Scrap	10,000		
	C.A.	21,641	× 30%	6,492

Chapter 6

Equity finance

Answer 1 – New share issues and pricing

(a) Price @ $2.40

Shareholders	No. shares	Before	After	Gain
Existing	10,000,000	2.50	2.81 (W)	3,100,000
New	1,000,000 (W)	2.40	2.81 (W)	410,000

Workings

No. shares to be issued = 2,400,000/2.40 = 1,000,000

Price after = 25,000,000 + 2,400,000 + 3,500,000/(10,000,000 + 1,000,000)

(b) All gains to existing shareholders

Shareholders	No. shares	Before	After	Gain
Existing	10,000,000	2.50	2.85	3,500,000
New	842,105	2.85	2.85	-

Workings

Price after = 2.50 + (3,500,000/10,000,000) = 2.85

No. shares to be issued = 2,400,000/2.85 = 842,105

Answer 2 – TERP

Old	4	@ $5.00	=	$20.00
New	1	@ $3.50	=	$3.50
	5			$23.50

TERP = $23.50/5 = $4.70

Value of a right = $4.70 - $3.50 = $1.20

Answer 3 – TERP and impact on shareholder wealth

Old	3	@ $8.00	=	$24.00
New	1	@ $6.00	=	$6.00
	4			$30.00

TERP = $30.00/4 = $7.50

Value of a right = $7.50 - $6.00 = $1.50

Wealth before = 1,200 shares @ $8.00 = $9,600

Wealth after = [(1,200 + 200) @ $7.50] – [200 x $6.00] + [200 @ $1.50] = $9,600

Answer 4 – Yield adjusted theoretical ex-rights price

Old	4	@ $2.25	=	$9.00	$9.00
New	1	@ $2.025	=	$2.025 x (0.14/0.1)	$2.835
	5				

Yield adjusted TERP = $11.835/5 = $2.367

Or;

$$\text{Yield adjusted TERP} = \frac{1}{4+1}[(N \times \text{cum rights price}) + \text{issue price} \times (Y_{new}/Y_{old})]$$

$$\text{Yield adjusted TERP} = \frac{1}{4+1} \quad [(4 \times \$2.25) + \$2.025 \times (0.14/0.10]$$

Yield adjusted TERP = $2.367

Chapter 7

Corporate Dividend Policy

No Examples

C: Financial risks

Chapter 8

Sources and types of financial risks

No Examples

Chapter 9

Currency Risk Management

Answer 1

Cost in GBP in one year is £102 (£100 x 1.02) and the cost in USD is $156 (£100 x $1.50 x 1.04).

The exchange rate in one year is $1.529:£1 ($156/£102).

Answer 2

Exchange rate is $1.75:£1 ($1.70 x 1.05/1.02)

Exchange rate is $1.801 ($1.75 x 1.05/1.02)

Answer 3

1. We will be receiving USD that need to be sold back to the market, therefore we need to sell USD and buy GBP. As the futures contracts are denominated in GBP (see contract size) then we will be buying GBP futures.

   The transaction date is the end of November and so we will use December futures (1.5136) as this is the first date after the futures expire after the transaction.

   The number of contracts requires are as follows:

   $500,000 needs to be covered using £62,500 futures contracts at 1.5136. $500,000 / 1.5136 = £330,338, hence 6 contracts (£330,338 / £62,500)

   So we will be buying 6 December futures as a futures price of 1.5136$/£

2. Profit/loss on futures contract

   Initially buy at 1.5136 and sell back at 1.6997, hence a gain of 0.1871 $/£ per contract.

   6 contracts entered and hence the total profit is 6 x £62,500 x 0.1871 = $70,162.50

3. Transaction at the spot rate on 30/11

   Receive $500,000 and sell (low) to the market, add the $70,162 gain on the future, at 1.71 $/£. Total receipt in GBP is £333,428 (= [$500,000 + $70,162] / 1.71)

Answer 4

(i) $200,000 would cost €140,000 (200,000 x 0.7) using the spot rate or €154,000 (200,000 x 0.77) if the option is exercised. Therefore, allow the option to lapse as it is cheaper without the option. Total cost of goods = €144,000 (140,000 + 4,000)

(ii) $200,000 would cost €160,000 (200,000 x 0.8) using the spot rate or €154,000 (200,000 x 0.77) if the option is exercised. Therefore, exercise the option. Total cost of goods = €158,000 (154,000 + 4,000).

Chapter 10

Interest Rate Risk Management

Answer 1

(a) Nero is borrowing funds so will be required to BUY a FRA.

(b) Interest rate is 6.5%

Interest paid (at market rate of 6.5%) = $2m x 6.5% x 3/12 = $32,500

Less: FRA receipt (FRA rate of 5%) = (6.5% - 5%) x $2m x 3/12 = $7,500

Net payment (equivalent to 5%) = $25,000

(c) Interest rate is 4%

Interest paid (at market rate of 4%) = $2m x 4% x 3/12 = $20,000

Add: FRA receipt (FRA rate of 5%) = (5% - 4%) x $2m x 3/12 = $5,000

Net payment (equivalent to 5%) = $25,000

Answer 2

1. Number of contracts to be sold (borrowing) = $6m / $500,000 x 6 months/ 3 months = 24 contracts
2. Futures position

   Sell at 92.00

   Buy at 90.00

   Gain of 2.00 (= 2% per standard 3-month, $500,000 futures contract)
3. Gain on futures contract = 2% x 24 x $500,000 x 3/12 (three months futures contract) = $60,000
4. Overall position

   Borrow for six months and pay interest at 10% = 10% x $6m x 6/12 = $300,000

   Less: gain on futures (from above) = $60,000

   Net payment = $240,000

D: Business valuation

Chapter 11

Implications of acquisitions, mergers and divestments

No Examples

Chapter 12

Divestments

No Examples

Chapter 13

Entity valuation – Theoretical Approach

Answer 1 – Valuation of equity (1)

$$P = \frac{D_o (1 + g)}{K_e - g}$$

$$P = \frac{0.20 (1 + 0)}{0.1 - 0}$$

$$P = \$2.00$$

Answer 2 – Valuation of equity (2)

$$P = \frac{0.15 (1 + 0)}{0.12 - 0}$$

$$P = \$1.25$$

Answer 3 – Valuation of equity (3)

$$P_{ex\text{-}div} = \$1.25$$

$$P_{cum\text{-}div} = \$1.25 + \$0.15 = \$1.40$$

Or, a formula can be use but note that it is not given within the exam.

$$P_{cum\text{-}div} = \frac{D_0 (1 + k)}{(k_e - g)}$$

Answer 4 – Valuation of equity (4)

$$P_0 = \frac{0.30 (1 + 0.04)}{(0.15 - 0.04)}$$

$$P_0 = \$2.84$$

Answer 5 – Valuation of equity (5)

$$P_0 = \frac{0.40\ (1 + 0.06)}{(0.20 - 0.06)}$$

P_0 = \$3.03

Answer 6 – Free cash flows

	\$000s
Profit before interest and tax (operating profit)	935
Less: Tax (20% x 935)	(187)
Add: Depreciation (non-cash)	120
Less: Investment in non-current assets	(420)
Less: Investment in working capital	(185)
FREE CASH FLOW	263
Less: Interest	(170)
FREE CASH FLOW TO EQUITY	93

Answer 7 – Free cash flow valuation (1)

$$P = \frac{CF_o\ (1 + g)}{K_e - g}$$

$$P = \frac{\$6.5\ m\ (1 + 0.02)}{0.08 - 0.02}$$

P (total) = \$110.5 million

P (per share) = \$110.5 million / 5,000,000
= \$22.1

Answer 8 – Free cash flow valuation (2)

$$P\ (\$'000s) = \frac{T_1}{340} + \frac{T_2}{410} + \frac{T_3}{450} + \frac{450\ (1.02)}{0.08 - 0.02}\ X\ DF_{3@8\%}$$

$T_{4-\infty}$

$$P\ (\$'000s) = \underset{T_1}{314.81} + \underset{T_2}{351.51} + \underset{T_3}{357.22} + \underset{T_{4-\infty}}{6,074.1}$$

P = \$7.1 million

Answer 9 – Valuation of irredeemable debt (1)

$$\text{Market value} = \frac{\$500,000 \times 10\%}{0.08}$$

Market value = \$625,000

Answer 10 – Valuation of irredeemable debt (2)

$$\text{Market value} = \frac{\$1{,}000{,}000 \times 6\%}{0.12}$$

Market value = $500,000

Answer 11 – Valuation of redeemable debt (1)

Market value = ($400,000 x 8%) x $AF_{1\text{-}5\ @12\%}$ + ($400,000 x 1.1) x $DF_{5\ @12\%}$

= (32,000 x 3.605) + (440,000 x 0.567)

Market value = $368,840

Answer 12 – Valuation of redeemable debt (2)

Market value = ($1,000,000 x 7%) x $AF_{1\text{-}4\ @10\%}$ + ($1,000,000 x $DF_{4\ @10\%}$)

= (70,000 x 3.170) + (1,000,000 x 0.683)

Market value = $904,900

Chapter 14

Entity Valuation – Practical Issues

Answer 1 – P/E valuation (1)

Market value per share = P/E ratio x EPS

Market value per share = 12 x (550,000/10,000,000)

= $0.66

Answer 2 – P/E valuation (2)

$$\text{Dividend cover} = \frac{\text{Earnings}}{\text{Dividends}}$$

$$3 = \frac{\text{Earnings}}{4{,}000{,}000}$$

Earnings = 3 x 4,000,000

Earnings = 12,000,000

Market value per share = 10 x (12,000,000/1,000,000)

= $120

Answer 3 – P/E valuation (3)

Value before:

Market value per share = 8 x $600,000
= $4,800,000

Value after:

Market value per share = 9 x ($600,000 + $450,000 + $100,000)
= $10,350,000

Amount to be paid by Woody to acquire Buzz is $5,550,000 ($10,350,000 - $4,800,000)

Answer 4 – CIV

PBT	$0.58m	80%
Tax		20%
Pre-tax earnings (0.725/80%)	$0.725m	100%

Excess return (pre-tax) = 0.725 – (0.12 x 1.85)
= $0.503m
Excess return (post-tax) = 0.503 x 80%
= $0.4024m
CIV = 0.4024/0.08
= $5.03 million

Chapter 15

Pricing issues and post-transaction issues

No Examples

Chapter 16

Systematic risk and the Capital Asset Pricing Model (CAPM)

Answer 1 – CAPM (1)

$E(r_i)=R_f + \beta_i (E(r_m) - R_f)$

$E(r_i) = 5\% + 1.5 (12\% - 5\%)$

$E(r_i) = 15.5\%$

Answer 2 – CAPM (2)

$E(r_i)=R_f + \beta_i (E(r_m) - R_f)$

$E(r_i) = 8\% + 0.8 (16\% - 8\%)$

$E(r_i) = 14.4\%$

Answer 3 – CAPM (3)

$E(r_i)=R_f + \beta_i (E(r_m) - R_f)$

$20\% = 8\% + \beta_i (25\% - 8\%)$

$\beta_i = (20\% - 8\%)/(25\% - 8\%) = 0.71$

Answer 4 – CAPM and investment appraisal

$E(r_i)=R_f + \beta_i (E(r_m) - R_f)$

$E(r_i) = 6\% + 1.4 (11\% - 6\%)$

$E(r_i) = 13\%$

$$NPV = (100{,}000) + \frac{15{,}000}{0.13}$$

NPV = $15,385

Positive NPV, therefore accept as it will increase shareholder wealth.

Answer 5 – Alpha values

Theoretical return = 4% + (10% – 4%)0.6 = 7.6%

Actual return = 8%

α = 8 – 7.6 = **+ 0.4%**

Answer 6 – Geared and ungeared βs (1)

(a) P's shares have the highest β and so are the more risky shares.

(b) To find the riskiest business activity, we will need to compare the ungeared β's of each entity

$$P\ plc = \beta_a = 1.8 \times \frac{100}{100 + (40 \times 0.7)} = \mathbf{1.41}$$

$$Q\ plc = \beta_a = 1.5 \times \frac{100}{100 + (20 \times 0.7)} = \mathbf{1.32}$$

1.41 > 1.32 so P is the more risky business

Answer 7 – Geared and ungeared βs (2)

In appraising a new project with a different business risk, the ungeared β from a company with similar business risk to the new project is calculates.

As Y plc is operating in the same industry as X's new project we will calculate the ungeared β from Y's information.

$$\beta_a = \beta_e \frac{E}{E + D(1-t)} = 1.8 \times \frac{100}{100 + (20 \times 0.75)} = \mathbf{1.57}$$

(a) As the project s finance entirely from equity the ungeared β can be substituted directly into CAPM.

Discount rate = 8% (18% – 8%) 1.57 = 23.7%

(b) Gearing ratio of 1.0 (debt to equity). As the project is financed by a mix of debt and equity the geared β will need to be calculated before being used in CAPM.

$$1.57 = \beta_e \times \frac{50}{50 + (50 \times 0.7)} = 2.669$$

Discount rate = 8% (18% – 8%) 2.7 = 35%

(c) Gearing ratio of 0.4 (debt to equity). As the project is financed by a mix of debt and equity the geared β will need to be calculated before being used in CAPM.

$$1.57 = \beta_e \times \frac{100}{100 + (40 \times 0.7)} = 2.0096$$

Discount rate = 8% (18% – 8%) 2.0 = 28%

Chapter 17

Efficient Market Hypothesis

No Examples